IRON AGE

JANUARY 24, 1952
VOL. 169, No. 4

CONTENTS

★ Starred items are digested on opposite page.

THE IRON AGE
Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N. Y.

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DIGEST

of the week in metalworking

PAGE 23

MAY RELAX CONTROLS ON STEEL PRODUCTS

The steel market picture is changing. The uniformly tight supply picture now shows peaks and valleys but overall supply cannot yet meet demand. A move to decontrol some items has been started by Washington. These products are chrome stainless and carbon tool steels, easier than most.

PAGE 24

MORE POWER TO SMALL PLANTS AGENCY?

Congress is being pressed to give Small Defense Plants Administration more money and more authority. One Congressman favors putting the Commerce Dept.'s Office of Small Business under SDPA. But Commerce Secretary Sawyer may be reluctant to give in. SDPA issued its first report.

PAGE 25

FOUNDERS SHOWING MORE OPEN CAPACITY

Founders' order books are showing more open space. One of the reasons cited is cutback of civilian industries while defense business continues to lag. Heavy castings are in much greater demand than lighter stuff. And steel founders are a little better off than others. Most have material.

PAGE 26

WAREHOUSE SUPPLIES STAGE COMEBACK

Steel supplies at warehouses are still far from normal but a definite improvement over the desperation point reached last year has come about. The most troublesome aspect of supply now are spot shortages. Some items such as structurals are tight but other items are comparatively easy.

PAGE 29

UNION QUESTIONS MANY INDUSTRY RIGHTS

A real battle is shaping up between steel industry and labor over management's right to manage. Some of union's current demands constitute a frontal assault on these rights. Matter is expected to get a thorough airing before WSB. Industry says granting demands would impair efficiency.

PAGE 46

NO EASY AUTO RADIATOR SOLUTION SEEN

The continuing copper shortage is making car radiators a problem for the auto industry. Unofficial estimates put the number of failures of a substitute radiator at more than 200,000. At the time the lacquered steel radiators were installed copper cutbacks made no other choice possible.

PAGE 53

TOOL ORDERS DIP BUT BACKLOGS RISE

Many major machine tool builders in recent weeks have been watching a decrease in the volume of new orders. Although some quarters interpret this as meaning that the industry is over the hump, industry leaders say that increasing backlogs, more orders ahead, will continue the shortage.

PAGE 63

LIGHT STEELS PRODUCED DIRECT FROM ORE

Fine prepared ore or mill scale is reduced with coke and limestone in a continuous kiln, yielding plain carbon or alloy steel. Bars, slabs, and pipe have been produced with densities of 1.0 to about 7.2 g per cc. Weight for weight, light steel, while weaker, is also much cheaper than aluminum.

PAGE 70

HEADER PRODUCES COMMUTATOR PARTS

Cold heading is Ford's answer to the problem of making copper commutator segments. These small intricately-shaped parts are needed in large quantities at low cost. The cold-heading production method developed by Ford enables 5 men to turn out 100,000 commutator segments in an 8-hr shift.

PAGE 72

FAST-QUENCH OIL IMPROVES HARDENABILITY

Maximum hardness penetration in thicker sections of aircraft steels and in "shallow" side alloys is possible with a new high speed quenching oil. Aircraft parts makers find less trouble in meeting compulsory hardness specifications. Quenching speed of the oil increases slightly in service.

PAGE 105

EXPECT SOME STEEL DECONTROL IN 3 WEEKS

In about 3 weeks the government is expected to relax controls on straight chormium stainless steels. A somewhat similiar move may be made on carbon tool steel. Industry will regard this piecemeal lifting, product by product, as a show of good faith. Other items may be relaxed soon.

NEXT WEEK

METALLIZING PROTECTS FROM SALT WATER

Aluminum and zinc sprayed on properly cleaned iron and steel and coated with vinyl sealers is effectively protecting steel fishing boats from salt spray corrosion. Maintenance costs are lower. Entire envelope of ships is sprayed during construction to protect hull and deck plates.

Only with B. F. Goodrich grommet belts can you make these savings!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

". . . within a few days ordinary belts had stretched . . . After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all . . ."

"Ordinary belts lasted only 5 or 6 weeks . . . B. F. Goodrich grommet belts are in their sixth month of service . . ."

"Previous belts suffered from shock loads, wore out fast . . . BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

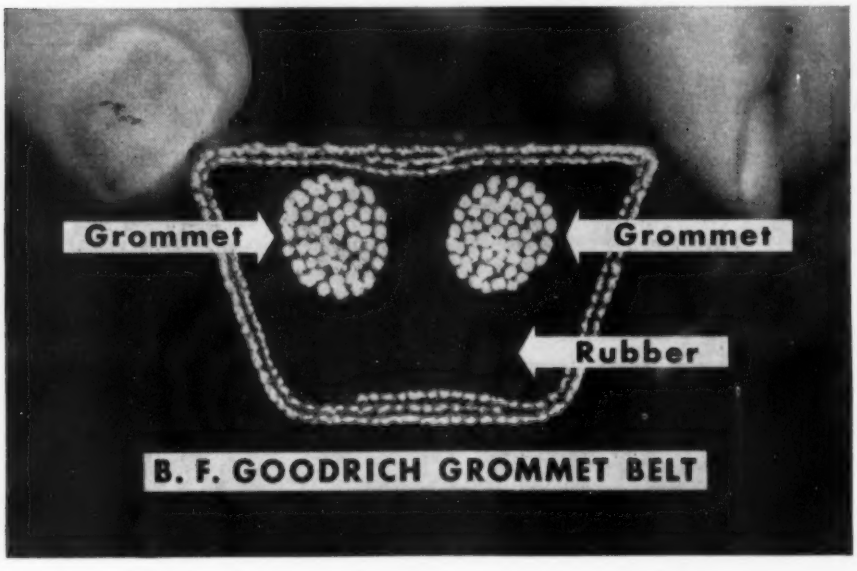
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. IA-1
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

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The Iron Age
FOUNDED 1855

What Price Conformity?

IN our zeal to be about as efficient as an electric clock we sure are going to some lengths. If you don't believe so: look around and keep your ears open. Watch the making of future executives.

There are stories on what part the good little wife shall play in the up-the-ladder-flight of her husband. If she holds the boss' hand too long she is making a play for him or else she is trying to get her husband ahead by "the grip." If she bends the elbow too much he has no more chance of becoming vice-president of turning out the lights than an Eskimo.

The white collars must have just the right amount of starch; the home atmosphere must be calm and tranquil. In addition to this the wife must know something about the private life of the Fiji or who killed Cock Robin. She must not bend or extend the finger while drinking tea—it will ruin her husband's chances of getting a five buck a week raise.

Fortunately the majority of industrial executives do not want to run the little wife or have anything to do with her. They know she has her own troubles. But there are many in responsible positions who would reach down into a man's home and have the whole family conform to the latest gimmick on how to become top man.

You might think this is pure fantasy. It isn't. At the rate we are going now we will, in years to come, have lost all semblance of that lusty, imaginative, straight from the shoulder person whom we swear at but respect. We will no longer have a "character" to talk about. They will be gone. Many of their successors will have been so tested by pyschologists and so affected by the "getting ahead" books and gimmicks that even a four letter word won't get their dander up.

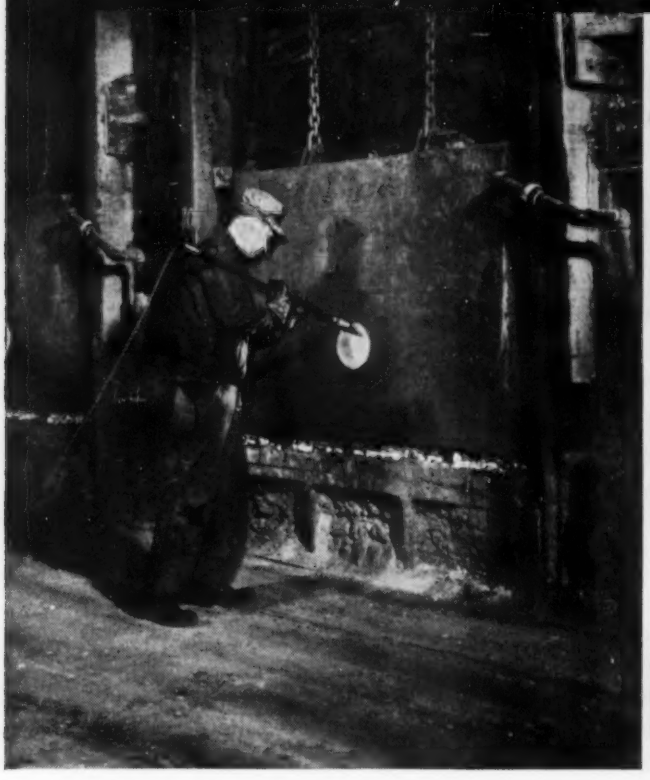
When we lose individualism, when we run our jobs so people have less and less of a private corner to return to now and then, when we wean future leaders with no more spunk than a milk toast, then we will be hard put to find a good reason for living. We need to improve but it doesn't have to be the brand of conformity that is stealing into our lives now under a guise of efficiency, graceful living and "reaching the top."

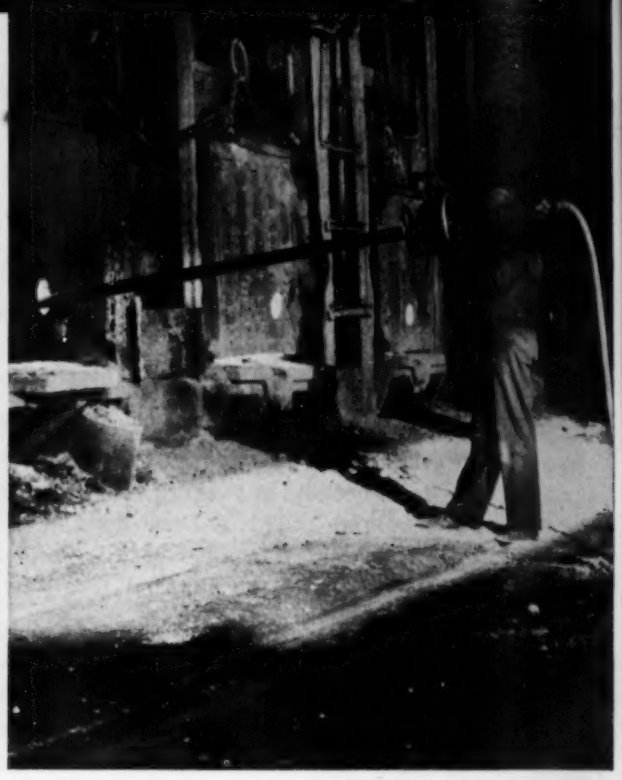
Tom Campbell

Editor

FOR MORE INGOT TONNAGE PER HEAT

Measure Temperatures By Immersion Thermocouple or Immersion Rayotube

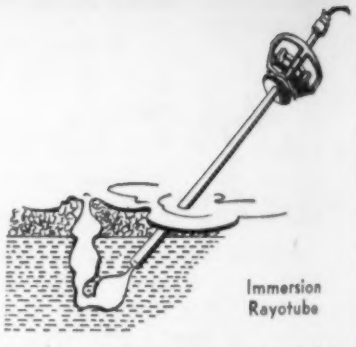




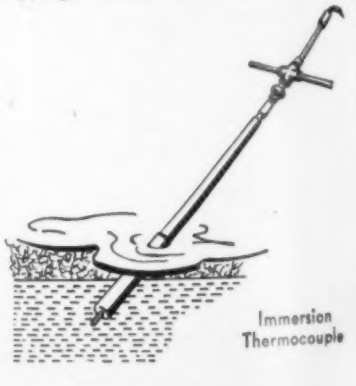
OPEN HEARTH and electric furnace shops can now choose between two tested L&N methods for measuring steel temperatures during the melt. Either an Immersion Rayotube or an Immersion Thermocouple is plunged momentarily beneath the surface to measure the temperature of the bath, while a dependable Speedomax Recorder displays the information where all concerned can use it.

Either method helps improve ingot production by warning if the steel is too hot or too cold for tapping. Recently published talks before national steel associations indicate that production losses have been sharply cut in plants where temperature is properly measured while the melt is finished off for tapping.

It pays to select your immersion-measuring equipment from a source which makes both radiation and thermocouple types. The two equipments cost about the same initially; among the factors which should be weighed without prejudice are: size and type of furnace, type and quality of steel, experience of helpers in using instruments, supervisory set-up and the differences in maintenance supplies and labor. If you'll contact our nearest office, or 4956 Stenton Ave., Philadelphia 44, Pa., we'll be glad to supply such other information as you desire.



Rayotube gets its reading inside a bubble blown by compressed air or other gas, while Thermocouple contacts the metal directly. Both methods give the "heart" temperature of the molten steel, and give it in time for any changes necessary before tapping.



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Dear Editor:

Letters from readers

The Harried Executive

Sir:

I consider the majority of your editorials to be among the finest and most thought-provoking of the many that I read. However, it is my belief that your editorial "The Harried Executive" in the Nov. 22 issue sketches a situation which I and many of my friends have been unable to confirm on the basis of personal experience.

When many of us, who have more than slight reason to believe that we could meet the needs and face the challenges implied in your editorial, attempt to find "takers" it appears that suddenly the situation has become a "buyers" market. Careful and effective provision of capable executive replacement talent three deep at every position has resulted in many outstanding men finally dying on the vine without realizing their full promise.

Having unburdened my chest, I hope you will excuse the criticism. I shall continue to look forward and to read with considerable pleasure and admiration your usually excellent ruminations.

NAME WITHHELD

For The Records

Sir:

We have been reviewing your Jan. 3 issue and note that our trademark Vitallium has been improperly used in a listing of high temperature jet engine alloys, on p. 450.

Vitallium is the registered trademark of Austenal Laboratories, Inc., applied to dental cast appliances made by Austenal and by various dental laboratories licensed by Austenal, surgical appliances made by Austenal, and dental and surgical alloy tested and approved and supplied by Austenal.

R. R. ROZEMA
Assistant Controller
Austenal Laboratories, Inc.
New York

New Refractory

Sir:

On the Newsfront page of your Dec. 20 issue reference was made to a new refractory for use in open-hearth superstructure.

Can you give us any further information on the material to which this item referred?

F. J. HARTWIG
The Babcock & Wilcox Co.
Alliance, Ohio

More details can be obtained from Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, Ohio.—Ed.

the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► Another reason steel will be easier after the middle of the year--barring serious labor trouble--is the size of inventories in automotive parts suppliers' plants. These inventories are legal but they will be topheavy in some cases because of cutbacks in auto production schedules. Before too long these stocks will bring cutbacks in steel orders from these suppliers.

► It is becoming clear that nodular or ductile iron has a number of properties--in addition to its strength and ductility--that make it attractive for the shell molding process. Good surface finish, relative insensitivity of the surface to pouring temperature and close control of surface chemistry are now demonstrated properties of this material.

► Ford Motor has confirmed reports that its engineering test models are being built on Kirksite 3-piece dies. Prototype models of the 1952 Ford, Lincoln and Mercury were built on Kirksite dies, assembled on a special jig and engineering tested before going into production.

In this way, both the model engineering and the new model tools were tested before going into production.

► Look for a drive for decontrol in steel once the wage-price fracas is settled. For unless there is bad labor trouble, high output will give strong support to the argument that voluntary controls can do a better job. Thought is that these could then be followed by free distribution with priorities only for direct defense material.

► Auto engineers expect fast growing public acceptance of power steering during 1952, with Lincoln joining Chrysler, Buick, Cadillac and Olds in offering it to the public.

A lot of experimental work is going forward on use of power steering for buses, trucks and farm tractors. Eventually the industry expects power steering to sell for about the same price as a car radio.

► What is believed to be the largest hydraulic press brake ever built will go into operation this year for fabricating aircraft sections. This 1800-ton brake will measure 44 ft from bed to ram.

► A new liquid additive for cutting oils is said to increase tool life and improve surface finish by reducing plastic deformation in the workpiece. The chemical embrittles the work surface so that plastic flow, and thus heat caused by the cutting operation, is reduced. Tool life increases up to 900 pct have been reported.

► Reports of initial surveys and mining operations in the Amapa manganese fields of Brazil indicate presence of some 10 million tons of high grade manganese ore there.

► John L. Lewis will go after another wage boost this Spring--and he'll naturally try to do better than Phil Murray. If he succeeds there will be another substantial addition to steelmaking costs.

All of which shows how the inflation spiral will go if it is not checked before the February 24 steel strike deadline.

Which to Use?

Ask A. O. Smith, world's leading user of welding as a production tool

Experience proves that neither an A.C. nor D.C. welder is a cure-all. Each has advantages on certain welding jobs and neither can do all welding jobs best.

A. O. Smith welding specialists stand ready to assist you, without obligation, in determining the type of welder best suited to your welding needs, best adapted to quality production with economy.

Decades of experience in the production of welded products of every description and size . . . auto frames, transmission pipe, pressure vessels, water heaters, penstocks, glass-lined tanks, to list a few . . . as well as a complete line of A.C. and D.C. welders and electrodes of all types puts A. O. Smith in a position to give you sound, dependable advice.

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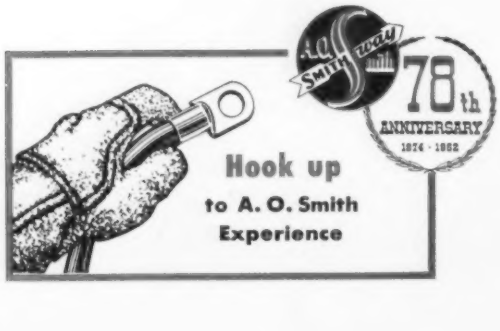

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Made *by* Welders . . . *for* Welders

STEEL: Will Washington Begin Decontrol?

Products no longer uniformly tight, shows peaks, valleys . . . Overall steel supply still short of demand . . . Some products easier . . . May start steel decontrol—*By W. V. Packard.*

The steel market picture has changed noticeably in the past several weeks. No longer are all products almost uniformly tight. There has been a marked easing in several items, a few of which are now in easy supply.

This does not mean that overall steel supply has swung into balance with demand. That goal is still at least several months beyond attainment, possibly longer. But chances are the government will soon be able to make a show of good faith on its promise to relax controls, product by product, as soon as feasible.

A move in this direction has already been started on straight chrome stainless and carbon tool steels. Decision is expected to be reached this week on whether to lift controls on these products completely, or just relax them. In either event restrictions will be eased, though it may be 3 weeks or so before the action is announced.

Seek Chrome Orders—This decision will be based on market factors which have been evident for some time. THE IRON AGE previously reported (Nov. 29, p. 119 and Dec. 6, p. 225) that stainless producers were actively seeking straight chrome orders. They need them to keep their furnaces going. The exception is one producer who booked far ahead several months ago. He is still booked into April.

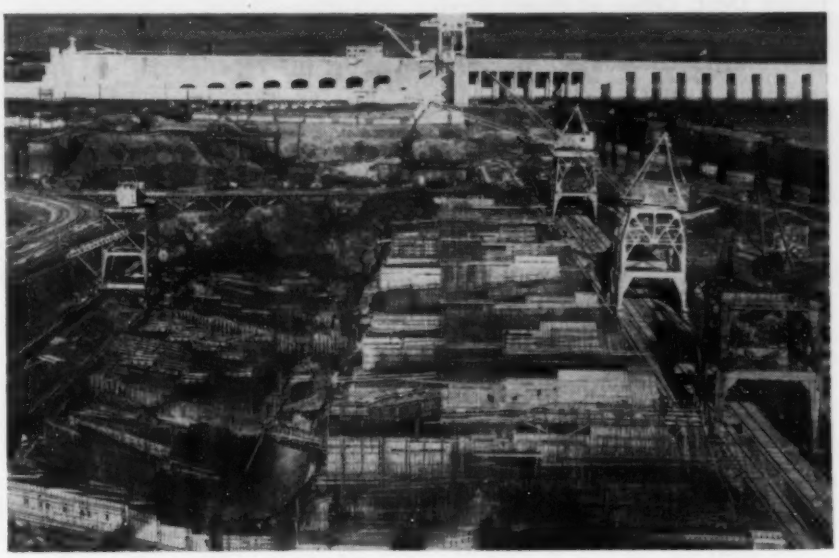
Consumers have been urged to switch from nickel grades to straight chrome stainless wherever possible. Some have done so with satisfactory results; others are still considering the change. Straight chrome is more difficult to work, both at mill and consumer level. But it is the best bet for future supply in applications where fabrication problems aren't too tough. The outlook for nickel is very dim for all except high priority uses. Mills report their nickel allotments have been getting smaller.

Carbon tool steel is in good supply at warehouse level. Behind this is a mill pool which is now pretty well filled. That's why industry has been advising controls officials to allow greater freedom in this market.

Bars Still Tight—On the other side of the ledger are a group of tonnage products which show no easing. All bars, excepting tool steel bars, are in tight supply. In structurals the gap between stated needs and supply has been narrowed. But it is still wide enough to keep strong pressure on the mills for at least the next several months.

Plate demand shows no sign of letting up. It is expected that even larger quantities of this product will have to be turned out on strip mills. Some sheet and strip producers have been turning to plate production even though they do not normally make plates. In the face of falling demand for flat-rolled products this has been necessary in order to keep operating at a high rate. This has trimmed profit margins, and, in some instances, has idled other finishing facilities.

The alloy picture is confused. Orders for military use, while large, have fallen far short of expectations. Yet other users have been cut back. The result: Open space on mill books. Engineering changes and tardy tool delivery have slowed the full impact of military orders. In addition, consider-



MILES OF STEEL: Thousands of reinforcing rods go into construction of McNary Dam, Columbia River. Demand-supply gap for structurals has narrowed—but not nearly closed.

SMALL PLANTS: More Power to Agency?

Congress may vote on putting Commerce Dept.'s Office of Small Business under Small Defense Plants Administration . . . Move to grant SDPA more funds . . . Issue report—*By R. M. Stroupe.*

Forthcoming congressional action will include a move to turn over more funds and additional authority to Small Defense Plants Administration.

Shortly after receiving the SDPA first quarter report on operations, Rep Wright Patman, D., Tex., said the agency needs greater financial capabilities to help it do its job.

Patman, head of the House Small Business Committee, also said he favors placing the Commerce Dept. Office of Small Business under SDPA. The office now is within the National Production Authority framework.

May Not Yield—Commerce Secretary Charles Sawyer may make a fight of it before surrendering titular control over Office of Small Business. Congress, however, is expected to consider seriously the point that policies designed to increase the defense role of small firms might be handled more efficiently by a single organization.

Gist of the report on the first 3 months' activities of SDPA was an assertion that "prompt and effective action" is needed to keep small concerns going during the rearmament period. On the other hand, Telford Taylor, SDPA chief, told Patman and other lawmakers the defense program can be expedited appreciably if "the tools and skills of small business" are used.

Taylor is anxious to persuade Comptroller General Lindsay C. Warren to extend his preferential-treatment ruling to cover advertised procurement. Warren recently announced that negotiated rearmament contracts may be placed with higher-cost producers if public interest is served thereby. (THE IRON AGE, Jan. 17, 1952, p. 52.)

Price Differentials—SDPA officials, the report said, are preparing, for Defense Dept. consideration, a proposed set of specific circumstances under which small business may receive price differentials in procurement contracts. The agency also wants to place personnel in military planning and procurement offices.

In its initial quarter of operation, according to the report, SDPA recommended three small business loans totaling $507,829 and was considering others totaling $5 million. Recommendations were made to Reconstruction Finance Corp., the actual loan agency.

SDPA is distributing, through RFC field offices and member banks of Federal Deposit Insurance Corp., copies of a pamphlet explaining how small companies can get loans under Section 714, Defense Production Act. A $100 million fund is provided for this purpose.

SDPA Plans 13 Regional Offices

To help operators of small businesses get the answers they want without traveling to Washington, Small Defense Plants Administration plans to set up regional offices in 13 major cities.

These offices probably will be small, to conform with what SDPA chief Telford Taylor calls "the narrow limits of our appropriations." They are to be located in Boston, New York, Philadelphia, Richmond, Atlanta, Cleveland, Chicago, Minneapolis, Kansas City, Dallas, Denver, San Francisco, and Seattle.

Launch Heat Treating Firm

The Electric Steel Treating Co. started operations at Bordentown, N. J., last week. The new firm will specialize in heat treating of tools and dies.

Company officials are: John B. Guthrie, Jr., president; Robert W. Guthrie, secretary-treasurer; and Edward W. Lerch, formerly with Bethlehem Steel Co., plant superintendent.

The completely electric plant is designed to service growing tool and die heat treating needs in the area surrounding U. S. Steel's new Fairless Works.

Continued

able tonnage delivered for military use is piling up in inventory.

Others Fill Breach — Demand for conversion ingots has improved. Although auto companies, who were the biggest sheet converters, started dropping out of the picture several months ago, others have taken up the slack. One mill with excess ingot capacity is booked through the end of this year. The British deal will put more pressure on semi-finished steel.

Mills report that the Controlled Materials Plan is now operating with less confusion. But their scheduling problems are still complex. Adding to their task is the need for greater quantities of hot-top quality steel. Carryovers into the second quarter will permit them to take care of some customers who would have been squeezed out by emergency schedule changes.

New steelmaking capacity will be a strong factor in the market this year — provided sufficient scrap is available to make it effective. New capacity is now coming into production at a rate of about a million tons a month.

FOUNDRIES: Some Order Books Sag

Both nonferrous and ferrous foundries in slump . . . Heavy foundries still busy but small ones report sharp drops . . . Few shortage problems in face of order dip—*By W. W. Taylor.*

Foundrymen now are faced with increasing open capacities. This is generally true throughout both ferrous and nonferrous shops, with the possible exception of the steel foundries.

On the average most of the heavy foundries are busy, though their orders have also taken a slight dip. But small plants are reporting in the neighborhood of 40 to 50 pct available time. Despite this, most firms reporting to THE IRON AGE maintain an optimistic outlook for the future.

Reasons offered for the open time are cutbacks in automotive and durable civilian goods industries and withdrawal from the market of many defense suppliers who have a backlog of castings.

Nonferrous Foundries—Material shortages have been reported in only a few cases and these were in nonferrous foundries where allotments of aluminum, brass and copper have merely given the right to purchase in a scarcity market. Many firms are eagerly searching for primary metal suppliers. Only in the far Middle West have gray iron founders experienced difficulty in obtaining pig metal, coke.

This does not mean that all gray iron, malleable or steel founders have no difficulties with materials. There are always a few cases where customers are too far away from their regular sources of supply. Scrap has been a headache but not troublesome enough to curtail production. Most serious is lack of steel rails.

One large midwestern founder with capacity for both malleable and steel casting reports cutbacks in operations. Supplying automotive and railroad castings, they have cut back more in their malleable casting and look now for a heavy truck building program to aid 1952 operations.

Another malleable founder says business began to fall off a few months ago. He claims, however, that more defense ordering is being felt. His normal volume comes from the automotive and agricultural equipment builders. Some steel foundries report business good, due mostly to the tank armor program.

Too Many Orders—While nonferrous founders continue in their search for metals, there are a few who can report "too much business." One Cleveland firm, casting heavy machinery pieces, is turning down orders. Working 6 days a week to catch up with a backlog, their biggest stumbling block is obtaining aluminum. Brass has not been as difficult.

Job work from larger foundries is a big aid to the smaller ones. But sometimes the erratic influx of orders makes it difficult to maintain a full working force.

Gray iron and malleable founders, hit hardest by cutbacks, are having the most trying labor problems. They know skilled molders, for example, are going to be difficult to find when the rush comes. But business conditions are not conducive to a full work week—and consequently a full staff.

Plastic Division—Some changes taking place in the industry warrant attention. One Cleveland nonferrous foundry has added a plastic molding division which has proved of great value. To conserve critical materials, glass fiber reinforced polyester plastics have been able to fill some needs.

Navy research men have shown interest in use of nodular iron for cast parts. A complete Bureau of Ships report on this production is still pending. But even enlarged demand for nodular iron castings may be of little help to gray iron foundries since acquiring a license, teaching personnel necessary technical steps, setting up production take time.

LADLE WORK: Operator tips big ladle to pour hot metal at foundry.

DPA Sets 1952 Magnesium Goal

A production goal of 145,000 tons of primary magnesium by the end of 1952 has been set by the Defense Production Administration. Six reactivated plants will then be in full production.

About 30,000 tons is expected to come from primary producers, 14,000 tons from secondary producers, and 101,000 tons from reactivated plants.

Consumption was 9000 tons in 1949, about 28,500 in 1950. Output in '51 was about 47,000 tons.

STOCKS: Warehouses Stage Comeback

Inventories low but sounder, business volume good . . . Some products very tight, others freer than last year . . . New M-6 well liked but CPR 98 could be better—*By R. L. Hatschek.*

Warehouse inventories are far from normal today but show definite improvement over the low point reached last year. One warehouse reports total stocks at about half to two-thirds normal, 20 pct or so higher than the low. Another indicates only 20 pct normal inventory but says turnover is five times as high. Sales volume is generally good.

The most bothersome aspect of supply is spot shortages. Some items—structural shapes, bars of all types, galvanized products and nickel stainless—are extremely short. Others, such as sheet, strip and chrome stainless, are much easier now than last year. Some, such as carbon tool steel and some wire products, never really tightened up. While a warehouse may get the tonnage it orders, there is no assurance of getting the requested sizes.

Appreciate M-6—Under modified NPA order M-6, warehouses are assured a 100 pct supply of their base period and can replace any steel sold on rated defense orders. M-6 is working quite well, say warehousemen. The Controlled Materials Plan is considered a necessary evil. J. D. Drummond, chairman of the Philadelphia chapter of the American Steel Warehouse Assn., pointed out at a recent meeting that CMP was a pain but, should we be swept into a full-scale war, having the machinery already set up would be of incalculable value.

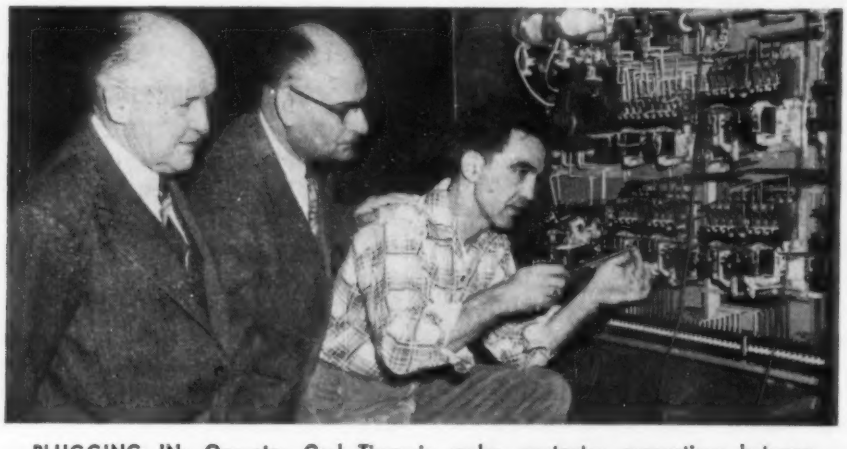
Pricing on the basis of fixed mark-ups from mill prices is approved in theory by warehousemen but it creates an overwhelming amount of clerical work for both warehouses and their customers. Ceiling Price Reg. 98 is particularly disliked by those who buy relatively large quantities from warehouses. Another difficulty is the geographic differentials allowed in the order.

Nobody particularly cares about the difference of 5¢ or so in prices of different warehouses. Each warehouse, however, must vary its prices almost every month. The result is that an order placed at say $5.98 per hundred lb may go down to $5.95 or up to $6.02 by the time of delivery, necessitating modifications to the books of both buyer and seller.

Cutting a Corner—One way around this difficulty is to calculate the lowest ceiling that will generally prevail and then stick to that figure regardless of the variations. Some warehouses are cutting this corner already and a warehousemen's committee was in Washington last week discussing possible improvements for CPR 98 with Office of Price Stabilization.

Warehouse salesmen are pretty busy today—not selling steel, but with the steel industry scrap drive. ASWA states that 70 pct of the 7000 warehouse salesmen across the country are members of local scrap committees.

Warehouse salesmen outnumber their steel company counterparts by two to one in the Philadelphia County committee. There just are more warehouse salesmen. The Philadelphia scrap drive, by the way, was used by National Production Authority as a model for drives in other sections.



PLUGGING IN: Operator Carl Timperio makes contactor connections between control panel and power unit of a motor drive made in Reliance Electric & Engineering Co.'s new Euclid, Ohio, plant. Watching are (left to right), James W. Corey, Reliance president and Kenneth J. Sims, Euclid mayor.

Delaware River Hearing Schedule

Industrial firms will be able to state their case for deepening the Delaware River channel when the Army Board of Engineers for Rivers and Harbors holds public hearings at Gravelly Point, near Washington, on Feb. 11.

A principal beneficiary, if the channel is dredged to a depth of 40 ft between Philadelphia and a point 5 miles below Trenton, N. J., will be the new Fairless Works of U. S. Steel. The company intends to import iron ore from Venezuela and approves deepening of the Delaware to accommodate ore ships.

Need Funds—Congress has authorized a project depth of 25 to 28 ft between Philadelphia and Trenton. However, the division engineer in that area has recommended that the 40-ft depth of the channel at Philadelphia be extended to the upstream end of Newbold Island.

If the Engineer Board approves the recommendation the approval will go to the Chief of Engineers before it can be proposed to Congress.

BUDGET: Nation Sprints into Debt

Administration asks for $85.4 billion . . . It's 29 pct of income . . . Deficit will be $14 billion . . . Will ask new taxes . . . Military will get 60¢ of budget dollar—*By A. K. Rannells.*

The White House this week asked Congress to appropriate in new funds and obligational authority about $85,400,000,000 to run the government for another year.

This figure represents about 29 pct of the national income and, if granted, is expected to be about $14 billion more than the nation's revenues. New taxes of $5 billion are asked to help offset the deficit.

Heaviest spending will be for military and related defense activities. This is estimated at $52,400,000,000, exclusive of military aid abroad. Largest single form of expenditure will be in the field of aviation, where $14 billion will be obligated.

Counted as defense but not included in the military budget is $10,800,000,000 for "international security and foreign relations." No details of this mutual security aid were submitted, other than that $8 billion would go for military aid and $2,800,000,000 would be for technical assistance.

A breakdown of military requests by major activities includes the following:

Air Force — $18,900,000,000, aimed at providing ten more air wings this year and eventually bringing air strength from the present 90 to 143 wings.

Army — $16,800,000,000, which provides increasing the service's strength from the current 19 to 21 divisions as well as maintaining the equivalent of six more divisions in the form of combat groups or regiments.

Navy — $12,300,000,000 estimated to provide for an increase of Navy's air groups from 14 to 16 and building up the active fleet from 393 to 408 major ships.

Marines—Funds would be provided by Navy to add one air wing and one infantry division, making three each.

Atomic Energy — $1,800,000,000 is asked now with more to be sought later with an eye to speeding up production rate of atomic weapons. Some Congressmen feel this program should be speeded.

Stockpiling — $1,100,000,000 is asked in money and obligational authority. This would result in delivered supplies totaling $5 billion and another $1.7 billion under contract in 1953.

Pleas for authorization of the St. Lawrence Seaway to facilitate ore hauling and yield new power sources were renewed as well as for the Hell's Canyon, Idaho, power project. About $37 million in cash is sought to begin work on these and two already authorized projects—Ice Harbor (Snake River) and the Hartwell Reservoir (South Carolina).

Here's how the Administration would spend taxpayer's dollars in fiscal 1953:

Military Services	60¢
Foreign Aid	13¢
Interest on Debt	7¢
Veterans' Programs	5¢
All Other Expenses	15¢
Total	$1.00

Here's where the budget dollar will come from:

Individual Taxes	36¢
Corporation Taxes	32¢
Borrowing and New Taxes	17¢
Excise Taxes	11¢
Customs, Other Taxes	4¢
Total	$1.00

Conservation

Aircraft Plant Runs Home Foundry

Solar Aircraft Co. at its San Diego plant is operating a "home" stainless steel foundry. Claiming a large scrap recovery of the 25 pct of each metal sheet that is lost in cutting, trimming, and turning operations, Solar foundrymen ferret out 75 pct of the in-plant foundry's raw materials from the bits and pieces of Solar scrap. The balance of each melt consists of raw ferroalloys.

Aircraft steel scrap contains large quantities of scarce nickel, tungsten, chromium, and columbium. Where previously scrap was routed through dealer, smelter, and foundryman, it now remains in the plant to be converted to the high alloy castings required in jet aircraft.

The foundry currently yields 700,000 lb of stainless steel castings yearly, and expects to push output to 840,000 lb soon.

C-PROCESS: Some Details Revealed

SAE speakers report on production of automotive parts . . . Automakers stay mum . . . Less sand adherence and sprue metal claimed . . . Find shell molds stronger—*By W. G. Patton.*

Secrecy of Big Three automotive producers on their experience with the new shell molding or Croning foundry process is still intact. But Auto Specialties Mfg. Co., St. Joseph, Mich., is not so jealous of its secrets. At the Detroit annual meeting of the Society of Automotive Engineers in Detroit, the firm revealed a detailed account of its casting techniques for limited production of crankshafts and valves.

Representatives of Ford, Chrysler, and General Motors were present—but only in a listening capacity. Sponsored by the SAE Materials Activities Committee, the paper was written by H. L. Day, Auto Specialties, and Richard Flinn and Kenneth Packer, University of Michigan.

Samples Shown—The paper dealt with experimental techniques in producing typical automotive castings. Sample products shown were exhaust valves and crankshafts. Surface characteristics of the castings were discussed and cost aspects of the shell mold process were compared with green and dry sand methods. Some future developments indicated by process progress were outlined.

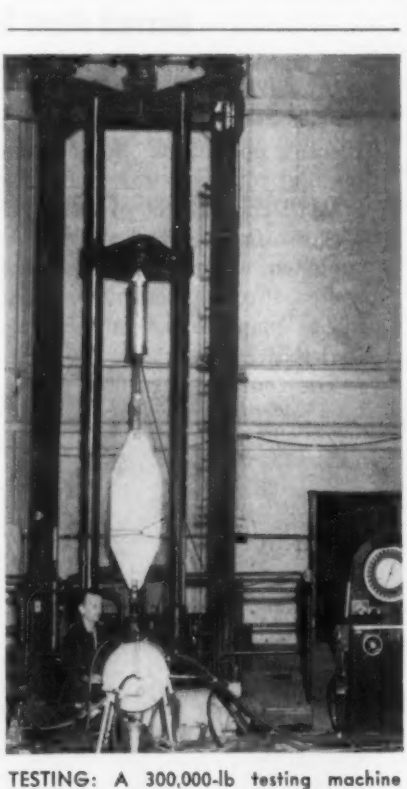
Among automotive parts now being produced experimentally by shell molding are camshafts, rocker arms, valves, crankshafts, and transmission parts. The process has also been applied successfully to ammunition.

Members of SAE saw the experimental installation at the Auto Specialties plant in colored motion pictures.

Experimental production of tractor crankshafts by the shell mold method was compared with the same products using conventional foundry methods. This is one of several large production items of Auto Specialties.

Advantages—Among several advantages of the process, said Mr. Day, are less adherence of sand to the casting and a reduction in sprue metal. Shell molds have higher strength than green sand and improved shakeout. There is a reduction in scrap and closer control of surface accuracy and surface chemistry is possible. Less metal is melted per casting and slag volume is also reduced.

Weight of 64-lb crankshaft castings can be held within ounces in production runs, claimed Mr. Day. Alignment along the axis is being held within a few thousandths. Surfaces vertical to the axis need little draft and no machining. Hot tearing and cracking have been completely avoided up to now.



TESTING: A 300,000-lb testing machine measures fatigue of airplane wing skin splice. Alternate high and low tension loads were weighed. Test was held in Structures Test Laboratory of Chance Vought Aircraft, Dallas, Tex. Machine was built by Baldwin-Lima-Hamilton Corp.

In Mr. Day's experimental work, A.F.S. sand of 100 fineness was used. About 8 pct powdered resin and a "dash" of kerosene is added to the mixture.

The audience also was shown the results of experimental wedge blocks cast to determine the volume-temperature limits of shell molds. At the University of Michigan, a Roughness Operated Distance Integrator (RODI) was used to scan the surface of cast experimental blocks to measure surface roughness. These experiments indicate gray iron can be cast at normal temperatures without appreciable metal penetration of the sand surface in sections up to 2 in. in size.

Thinner Sections—Investigations of the surface characteristics of 0.40 pct cast carbon steel indicate this metal should be confined to thinner sections and normal pouring temperatures.

Ductile iron showed little sensitivity to pouring temperatures as far as surface roughness is concerned.

The author's experience indicates the shell molding process merits considerable attention for high production castings requiring good surface finish and close dimensional tolerances. Future developments in machine design and resin cost as well as the development of new foundry skills will ultimately determine the application of the shell mold process by industry, Day believes.

Spectrometer Installed

The new chemical laboratory of Vanadium-Alloys Steel Co. is housed in a new building more than twice as large as the previous laboratory. Completely new equipment has been provided for this department which operates on a 24 hr per day basis, Vanadium-Alloys reports.

Outstanding feature is the direct reading spectrometer which determines analysis of steel by measuring light waves emitted by various chemical elements.

STEEL: Who Has the Right to Manage?

Industry, union may battle over management rights . . . Steel charges union encroachment . . . May strip industry of right to plan efficiently . . . Murray blasts away—*By J. B. Delaney.*

A real battle is shaping up between steel labor and the steel industry over management's right to manage. This has been an issue since 1937 when the first contracts with the United Steelworkers of America (CIO) were signed. But some of the union's current demands constitute a frontal assault on these rights.

Management awareness of this trend is evident in public and private discussion. The union is also more outspoken on the subject. Although overshadowed by the noisy debate over wages and prices, the matter is likely to get a thorough airing during Wage Stabilization Board panel hearings which resume in New York Feb. 4.

Union encroachment on so-called management prerogatives is described by some industry people as a form of creeping paralysis. Since signing of the first contracts, the union has slowly moved in to participate in decisions on matters previously considered strictly within the province of company managers.

Against Efficiency—An industry statement on current union demands asserts some of them "would seriously impair the ability of the steel companies to continue to improve, or even maintain, operating efficiencies."

The statement asserts the union wants to take away management's right to organize the work and to direct the working forces in an efficient manner. It seeks to deprive management of its privilege to continue to make contracts with outside firms for specialized work, to require employes to join the union as a condition of employment, to guarantee a year's pay whether or not there are any orders on hand, to fill vacancies on the basis of seniority rather than on ability to do the job, and so on.

Admiral Ben Moreell, chairman and president of Jones & Laughlin Steel Corp., said recently that one of three important issues involved in the dispute between the union and the industry is whether the industry should accept the union's "non-economic" demands "and relinquish some measure of control to the union."

"Can Do Better Job"—Adm. Moreell said he believed management should continue to manage—"because it can do the job better than anyone else. Furthermore, there are certain legal obligations to stockholders which forbid management to surrender its duties to anyone."

The union feels that management exercises too much control over the workers.

In an outburst at a press conference last Dec. 17, Philip Murray, union president, pointed out that management now has the right: (1) to establish a job, (2) to change a job, (3) to terminate a job, (4) to arrange a job, (5) to re-arrange a job, and (6) to specify new duties.

"You have to go to Russia to equal that," Murray said. "And yet those are so-called management rights."

"Tool and die maker."

Strikes:

Good 1951 record changes White House view of Taft-Hartley Act.

The White House apparently has abandoned its position that the Taft-Hartley Act is a slave-labor law. This year, the President asks only for changes and improvements instead of outright repeal.

A report on work stoppages during 1951, released by the Bureau of Labor Statistics on the heels of the White House State of the Union message, showed that in this respect labor conditions were the nation's best since 1946, the reconversion year.

Employment rolls were at an all-time high in 1951, fewer man-days were lost, and smaller numbers of workers were involved in strikes, reported the BLS.

Steel Strikes—Comparative figures are: Number of strikes (involving six or more workers)—4843 in 1950, 4650 in 1951; workers involved—2,410,000 in 1950, 2,130,000 in 1951; man-days of production lost—38,800,000 in 1950 and 22,600,000 in 1951.

Work stoppages in the steel industry included one in February at Tennessee Coal, Iron & Railroad Co., involving 18,000 workers and lasting 13 days and another in October, this time tying up 25,000 employees for 17 days; Jones & Laughlin Steel Corp., in July, involving 12,000 workers, and lasting 5 days; and the Inland Steel Co. strike in October, involving 14,500 workers for 8 days.

Two other major stoppages occurred in July. One was the Chrysler Corp. (Dodge) tie-up of 27,000 workers for 12 days. The other was the Caterpillar Tractor Co. strike of 24,000 for 63 days.

OPS: New Orders in Metalworking

Springs, stampings and screw machine products get tailored pricing regulation . . . Small orders exempted from controls . . . Bolts, nuts, screws & rivets now under CPR 118, not GOR.

Two new pricing regulations this week made life easier for producers of several important groups of metal products. Mechanical precision springs, metal stampings, and screw machine products are now priced under a tailored regulation.

Some 220 producers of bolts, nuts, screws, and rivets are affected by the second order, which is expected to eliminate some of the difficulties of using GCPR.

Basically, the first order, Ceiling Price Reg. 119, sets ceilings on the basis of the price-determining method used by the manufacturer during the period Jan. 1-June 24, 1950, as applied to labor and materials costs as of Mar. 15, 1951. All overhead costs in effect Jan. 1 - June 24, 1950, are applicable.

Small Orders—CPR 119 exempts so-called "small orders" in which total dollar volume of sales in any calendar quarter is not greater than total value of similar sales in the highest-sales-volume quarter between Feb. 1, 1950, and Jan. 31, 1951. Orders affected are those of less than $200 for mechanical springs; less than $500 for metal stampings; and less than $400 for screw machine products.

Producers wanting exemption on small orders must report to Office of Price Stabilization in which quarter during the 12-month period they had the greatest dollar volume of such sales.

Nuts & Bolts—The second order, CPR 118, generally establishes ceilings for bolts, nuts, screws, and rivets on the basis of published list prices in effect on Jan. 25, 1951, subject to discounts, differentials, terms, and conditions of sale and delivery in effect on that date.

OPS says its information indicates the ceiling price level established by the new regulation is "substantially the same" as would be reached by applying pricing formulas provided in CPR 22, covering general manufactures.

STEEL: Finished Shipments Down in November

As Reported to American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH Carbon	Alloy	Stainless	Total	Pct of Total Shipments	TO DATE THIS YEAR Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	88,026	24,106	1,229	113,361	1.7	950,622	223,708	17,268	1,191,598	1.6
Blooms, slabs, billets, tube rounds, sheet bars, etc.	121,087	47,565	1,402	170,054	2.6	1,521,457	*526,222	16,726	*2,064,405	2.9
Skelp	14,981	.....	.....	14,981	0.2	140,964	.....	.....	140,964	0.2
Wire rods	70,904	1,179	546	72,629	1.1	765,443	*14,981	4,525	*784,949	1.1
Structurals	417,005	4,424	4	421,433	6.5	4,453,659	60,018	72	4,513,749	6.2
Steel piling	28,635	.....	.....	28,635	0.4	367,000	.....	.....	367,000	0.5
Plates	635,277	29,559	1,557	666,393	10.2	6,824,364	362,144	16,052	7,202,560	9.9
Rails—standard	126,714	—13	.....	126,701	2.0	1,561,243	156	.....	1,561,399	2.2
Rails—all other	9,349	—5	.....	9,344	0.1	112,603	51	.....	112,654	0.2
Joint bars	10,671	.....	.....	10,671	0.2	121,996	.....	.....	121,996	0.2
Tie plates	33,057	.....	.....	33,057	0.5	409,677	.....	.....	409,677	0.6
Track spikes	10,516	.....	.....	10,516	0.2	147,670	.....	.....	147,670	0.2
Wheels	34,536	17	.....	34,553	0.5	367,047	172	.....	367,219	0.5
Axles	16,746	26	.....	16,772	0.3	204,449	586	.....	205,035	0.3
Bars—hot rolled	576,378	198,058	3,569	778,005	12.0	6,036,145	2,093,168	39,275	8,168,588	11.3
Bars—reinforcing	154,765	.....	.....	154,765	2.4	1,737,958	.....	.....	1,737,958	2.4
Bars—cold finished	134,373	29,408	3,444	167,225	2.6	1,427,047	311,395	37,938	1,776,380	2.5
Tool steel	2,485	10,898	.....	13,383	0.2	30,645	126,632	.....	157,277	0.2
Standard pipe	251,520	23	4	251,547	3.9	2,694,753	1,353	66	2,696,172	3.7
Oil country goods	142,412	12,757	.....	155,169	2.4	1,530,284	178,096	.....	1,708,380	2.4
Line pipe	259,640	69	.....	259,709	4.0	2,928,259	860	.....	2,929,119	4.0
Mech. tubing	56,749	26,723	553	84,025	1.3	621,669	275,529	5,763	902,961	1.2
Pressure tubing	29,670	3,123	855	33,648	0.5	266,246	22,978	9,259	298,483	0.4
Wire—drawn	257,658	3,880	2,503	264,041	4.1	2,894,148	47,242	28,967	2,970,357	4.1
Wire—nails, staples	73,247	.....	1	73,248	1.1	796,769	.....	30	796,799	1.1
Wire—barbed, twisted	25,640	.....	.....	25,640	0.4	215,825	.....	1	215,826	0.3
Wire—woven fence	33,841	.....	.....	33,841	0.5	386,807	.....	.....	386,807	0.5
Wire—bale ties	9,454	.....	.....	9,454	0.2	101,325	.....	.....	101,325	0.1
Black plate	107,079	.....	.....	107,079	1.6	963,456	.....	.....	963,456	1.3
Tin & terne plate—hot dipped	100,481	.....	.....	100,481	1.5	1,512,532	.....	.....	1,512,532	2.1
Tin plate—electrolytic	226,837	.....	.....	226,837	3.5	2,625,058	.....	.....	2,625,058	3.6
Sheets—hot rolled	636,570	19,471	3,423	659,464	10.1	7,272,499	274,774	35,752	7,583,025	10.5
Sheets—cold rolled	783,082	5,971	11,869	800,922	12.3	8,675,176	105,003	*96,681	*8,876,860	12.2
Sheets—galvanized	143,044	.....	.....	143,044	2.2	1,838,983	907	.....	1,839,890	2.5
Sheets—other coated	18,801	.....	.....	18,801	0.3	236,759	.....	.....	236,759	0.3
Sheets—enameling	11,826	.....	.....	11,826	0.2	164,663	.....	.....	164,663	0.2
Electrical sheets, strip	8,114	50,409	.....	58,523	0.9	127,168	575,444	.....	702,612	1.0
Strip—hot rolled	181,353	2,456	554	184,363	2.8	1,984,332	35,408	7,255	2,026,995	2.8
Strip—cold rolled	147,662	2,374	14,872	164,908	2.5	1,717,616	26,353	*178,292	*1,922,261	2.7
TOTAL	5,990,185	472,478	46,385	6,509,048	100.0	66,734,316	5,263,180	*493,922	72,491,418	100.0

During 1950 the companies included above represented 99 pct of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

Industry Controls This Week

NPA Orders:

M-6A, Dir. 1—Sets rules under which warehouses must give preferential treatment to machine tool builders, military, and atomic energy orders. Distributors must accept A, B, C, E, or Z-2 over other rated orders when order may be filled from stock. Warehouses can replace these items by ordering them in addition to quotas.

M-48, Amend.—Removes limitations on bismuth. Sets relaxed inventory control system.

OPS Orders:

Sup. Reg. 13, GCPR, Amend. 6—OPS may adjust producer's ceiling for benzol or naphthalene to compensate for higher costs after Jan. 25, 1952. Producer must apply to CPS.

CPR 54, Rev. 1—Sets new pricing basis for U. S. sales of aluminum scrap and irony aluminum. Effective Jan. 16.

Machinery Rents Changes Planned

A specific dollars-and-cents regulation covering construction machinery rentals probably will be developed by Office of Price Stabilization.

In addition, spokesmen for the construction machinery sales, service, and rental industry were told

recently, OPS proposes to draft a tailored order regulating sales of used construction items. The order would follow the general lines of Ceiling Price Reg. 105 (used industrial and construction machinery), with modifications to conform to particular business practices.

Construction machinery manufacturers, represented by a committee which has met with OPS officials, have recommended that individual companies be given the option of pricing under either CPR 30 (machinery) or the General Ceiling Price Reg. Some representatives of the manufacturers suggested price exemption for their products.

Set Scrap Pig Iron Exports

First quarter export quotas have been set at 25,000 tons of iron and steel scrap and 2500 tons of pig iron. This quota is one-fourth of normal year shipments. Bulk of the scrap will go to Mexico traditionally dependent on the U. S. for its metallics.

Scrap exports have now been placed on a quarterly quota basis instead of the former semi-annual basis in order to keep a tighter rein on such shipments.

The first quarter quota was 2000 tons under the 27,000 tons quarterly average for 1951.

New Export License Form Tested

A revised export license form (IT-419) which requires only a single certification is being put into use on a trial basis through April 15.

After that date, the old form will be discarded. But exporters should go slow in having the new form reprinted in quantities until after April 15 because the 3-month test run may bring more revision.

All Bismuth Use Controls Lifted

All limitations on the use of bismuth were removed last week by the National Production Authority.

This rescinds restrictions over use, both as to type and quantity as well as the set-aside provision. But a relaxed inventory control in the form of monthly consumption and inventory level reports is still contained in the amended M-48.

The agency said that supplies for the next several months are expected to be in adequate supply for both defense and civilian consumption.

More Spare Parts for Farms Asked

Agriculture Secretary Brannan has thrown his support behind a program of maintaining production of spare and replacement parts for agricultural machinery and equipment at least 20 pct higher than 1949 levels.

Shortages of materials will keep production of new equipment below requirements during first half 1952, Brannan says. This means that production of repair parts must be at least a fifth above normal levels.

Tool Export Licenses Limited

Beginning Feb. 1, non-portable, power driven machine tools and metalworking machines will not be licensed for export unless they are already in possession of the exporter or he has a rated order. This new policy of the Office of International Trade is in accordance with M-41 which bans delivery of varied metalworking equipment having a factory price of $350 or more to a private buyer except on a rated basis.

Reusable Pipe Price Boost Asked

Resellers of oil country tubular goods want the ceiling price for reusable pipe set at 95 pct of the price for comparable new pipe, as an incentive for bringing more reusable pipe into the market.

This was the opinion of a committee representing resellers

which met recently with officials of Office of Price Stabilization. The group also suggested that ceilings for unreconditioned pipe be controlled on the basis of ceilings established for all reusable pipe.

Now 80 Pct—Reconditioned and reusable pipe, priced under Ceiling Price Reg. 98, currently is priced at 80 pct of the figure for comparable new pipe. Unreconditioned pipe is not under price control when sold to a reconditioner, but has a ceiling of $65 per ton when sold to any other buyer.

Casing, tubing, drill pipe, and drive pipe are within the OPS definition of oil country tubular goods.

Rutile Ore Prices Decontrolled

All sales of domestic and imported rutile ores and concentrates, in addition to the mining and processing of these materials, now are exempt from price control.

Office of Price Stabilization authorized the exemption in Amendment 13 to General Overriding Reg. 9, effective Jan. 18. The agency took this action, officials said, to prevent needless interference with the rearmament program through excessive use of time in working out pricing problems.

Annual U. S. sales of rutile, used in production of ferro-titanium alloy products and titanium metal, are estimated as "substantially less" than $5 million. Approximately 50 pct of the rutile sold is imported, principally from Australia.

Aluminum Scrap Prices Changed

U. S. Government sales of aluminum scrap and irony aluminum are priced on the basis of a new method prescribed in Revision 1 to Ceiling Price Reg. 54. The revision took effect on Jan. 16.

Originally CPR 54 directed that ceiling prices for wrecked aircraft and irony aluminum should be established on a delivered basis. As revised, the regulation authorizes ceilings for government sales of

these materials in terms of cents per lb of material, f.o.b. shipping point, with provision for specific deductions for "where is" sales.

A further change in Rev. 1 is the increasing of previous ceilings for a comparatively few grades of scrap and ingot, including aluminum foil scrap, sweated pig aluminum or ingot, and the deoxidizing grades of secondary aluminum ingot.

No Metals Relief Seen in '52

Defense Production Administrator Fleischmann last week forecast that there would be "no widespread relief" from metal shortages during the remainder of 1952.

"The second and third quarters of 1952 may be the tightest periods for scarce materials," he said, speaking of new production.

As a result, DPA has set aside for the second quarter about 2 million tons of steel, 100 million lb of copper products, and 4 million lb of aluminum for MRO use.

FERROALLOYS: Molten ferroalloy is repoured from ladle into chills at Electro Metallurgical Co.'s new $100 million plant at Marietta, Ohio. When completed in 1953, the works will have 24 electric furnaces, of which four are now in operation.

Revised Allotment Symbols

The following allotment and DO symbols and the programs to which they apply represent the latest revisions and changes to the list reprinted in THE IRON AGE, Jan. 3, 1952, p. 344. The symbol listed previously as "Z-8" is now changed to read "DO-Z-8" to emphasize that the symbol is for use in basketing small orders for *non-controlled* materials, but *not* for use in basketing controlled materials orders.

Revisions follow:

CMP Allotment and/or DO Rating Symbol	*Major Program Involved*	*Claimant Agency or Industry Div., Etc.*
C-7	Repair and Utilities—Posts, Camps & Stations	Defense Dept.
C-8	Navy Controlled Material Warehouse	Defense Dept.

CMP Allotment and/or DO Rating Symbol	*Purpose*
W-5	Distribution of Controlled Materials to Retailers (M-89)
DO-Z-8	Basketing—NPA Reg 2

POURING IT ON: Paint foreman R. W. Spence of Aluminum Co. of America's New Kensington, Pa., plant has come up with an idea that cuts fence maintenance costs 50 pct. The idea: to pour rather than brush or spray paint on wire fence. Closely-fitted panels on each side of fence guide paint over the wire. After pouring, one painter quickly brushes missed spots.

DMPA Pays Premiums for Copper

Defense Materials Procurement Agency implemented its previously announced policy of paying what amounts to subsidies so that copper production from presently operating mines should not be lost. It granted the first of such contracts to Calumet & Hecla Consolidated Copper Co. for production from four of its mines.

DMPA insists that this is a move merely to maintain the copper output rate and won't add to the supply. Premiums ranging from 5¢ to 6¢ per lb of copper will be paid for production of the four mines over the next year or so. DMPA estimates that about 1 million lb of copper that might have been lost because ceiling price restrictions made the mines uneconomical will now flow back into industry.

Negotiations for more subsidy payments to copper producers are being conducted by DMPA. These subsidy contracts will be tailored to fit specific needs.

Anaconda Signs Uranium Contract

Atomic Energy Commission has signed to buy, for a 5-year period, uranium from an ore-processing plant to be built by Anaconda Copper Mining Co. at Grants, Valencia County, N. M.

Anaconda, which will build, own, and operate the facility, expects to begin production in April, 1953. AEC will arrange to provide a market for ores produced by other operators.

Ore was first detected in the Grants area in the summer of 1950. Since then, Anaconda and the Santa Fe Pacific Railroad Co. (affiliated with the A. T. & S. F.) have conducted large-scale exploration and development work.

Results of these activities and additional prospecting and development performed by other private interests, AEC said, show there are sufficiently large quantities of "limestone gangue uranium-bearing ores" at Grants to warrant building of a processing plant.

—Defense Contracts—

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal, and opening date. (Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q.")

Armed Services Medical Procurement, Brooklyn
Lab equip & supplies, 26,532 ea, 904B, Jan. 25.
Hospital equip. & supplies, 54,912 ea, 907B, Jan. 28.
Mill, boring, motor driven, 5, 3114-Q, Feb. 3.

Navy Purchasing Office, Washington
Pliers, adjustable, 31,396, 5745-B, Feb. 14.
Threading sets, bolt and screw, 5747-B, Feb. 12.

Detroit Arsenal, Centerline, Mich.
Casting, not machined, pearlitic malleable-iron class, 23,200 ea, 52-136-B, Feb. 7.

Corps of Engineers, St. Louis
Adapter, grooved pipe, steel grove to flange, (ENG-23-065-52-509-B), Jan. 28.
Adapter, flange size, 250 ea, (ENG-23-065-52-509-B), Jan. 28.

Corps of Engineers, Chicago
Tractor, wheel type, pneumatic tires, 3 ea, A-6Q, Jan. 25.
Crane, for loader, front w/hook, 2 ea, A-6Q, Jan. 25.
Bolt alloy stl hex hd, 20,000, 52-1077B, Jan. 29.
Bolt hex hd semi-fin, 35,000, 52-1077B, Jan. 29.
Bolt oval hd alloy stl slotted, 20,000, 52-1077B, Jan. 29.
Bolt hex hd semi-fin alloy stl, 100,000, 52-1077B, Jan. 29.
Bolt hex hd s-fin alloy stl, 5000, 52-1100B, Feb. 8.
Bolt carriage rd hd sq nk, 210,000, 52-1095B, Feb. 8.
Bolt carriage sq nk stl w/nut, 50,000, 52-1095B, Feb. 8.
Gear transfer unit input shaft, 600, 52-754B, Feb. 21.
Gear high speed ord, 100, 52-754B, Feb. 21.
Gear set transfer forward drive, 1080, 52-754B, Feb. 21.
Gear ord drg, 450, 52-754B, Feb. 21.
Screw, cap hex hd stl, 20,000, 52-1115B, Feb. 5.
Kit, repair, winch universal joint, 510-1040B, Feb. 19.
Pin, clevis, clutch shaft lever, 210, 52-1040B, Feb. 19.
Yoke, slip, propeller shaft, 150, 52-1040B, Feb. 19.
Washer, transfer declutch shifter, 52-1040B, Feb. 19.
Valve, refacer electric/wet type, 450, 52-1084B, Feb. 7.
Bolt, hex hd alloy stl drill for locking wire, 20,000, 52-1100B, Feb. 8.
Bolt, alloy stl hex hd, 20,000, 52-1100B, Feb. 8.

U. S. Army, Pittsburgh.
Adapter, treadway steel, U. S. Army, 24 (DA-ENG-36-058-52-66B), Jan. 29.
Treadway, steel, 144 (DA-ENG-36-058-52-69B), Jan. 28.
Wedge, treadway, hook end, 20 (DA-ENG-36-058-52-69B), Jan. 28.
Rope, wire, steel, plow, improved, uncoated, fiber core, 500 ft, (DA-ENG-36-058-52-69B), Jan. 23.
Rope, wire, steel, plow, 4000 ft, (DA-ENG-36-058-52-70B), Jan. 23.

Signal Corps Supply Agency, Philadelphia
Signal corps crossarm PF-206, var, 11122-36-Q, Jan. 31.
Gaskets engine type part, 11684-20Q, Feb. 4.
Switch slide SPST phosphor, 50 ea, 11640-20-Q, Feb. 1.
Antenna AT-339, var, 11427-29-Q, Feb. 4.
Slide assy, 38,000 ea, 52-122B, Jan. 28.
Barrel cal .45 M1911A1, 120,000 ea, 52-122B, Jan. 28.

U. S. Dept. of Commerce, Washington
Tubes, radio, 12 ea, B-1-1324-52, Jan. 18.
Wire, heating and resistance, 10 lb, B-1-1324-52, Jan. 18.
Capacitor, Elmenco, 300 ea, B-1-1324-52, Jan. 18.
Generator, 1 ea, (CS-52-122-1-30), Jan. 30.

Congress to Shelve Most of Fair Deal

Lawmakers not enthusiastic over business legislation proposed by President . . . Hold the line on taxes, controls . . . List Truman requests, chances of rejection—*By G. H. Baker.*

Lack of enthusiasm at the Capitol for President Truman's new 12-point program of "must" business legislation now may be regarded as clear-cut evidence that Congress is willing to shelve most—if not all—of the "fair deal" for the balance of 1952.

Congress is far from convinced that Mr. Truman and his Council of Economic Advisers are on sound ground when they advocate fighting Communism through the extension of social reforms on the domestic front.

No Tax Increases—There is almost unanimous agreement among leaders of both parties that there will be no large tax increases this year. Certainly, Congress is in no frame of mind to vote the White House anything like the $5 billion in new revenue requested. And there is a marked lack of spirit—even among Democrats—for Mr. Truman's proposal to enact tighter controls over prices and credit.

Federal spending, if the White House has its way, will hit a whopping $85.4 billion in fiscal 1953. There is no suggestion from Mr. Truman nor from his leaders that expenditures be trimmed to fit income. In fact, Mr. Truman says in his annual economic report to the Congress, it would be "false economy" even to talk of balancing the budget.

Requests, Rejections—Point by point, here is what Mr. Truman is asking, and what he is likely to get between now and the scheduled July adjournment of Congress:

(1) Renewal of the Defense Production Act for 2 years, including tighter controls over prices and credits. Present thinking is that a 1-year extension—to July 1, 1953—is the most Mr. Truman can hope for.

(2) Further extension of military and economic aid abroad. Terrific congressional battle looms over this request. Aid will be granted, but in sharply-reduced form.

(3) Additional funds for the Small Defense Plants Administration. Small-business aid is always popular in an election year. Chances are good for approval of the full $500 million loan fund requested.

(4) Authority to build the St. Lawrence seaway and other power projects. Approval of the St. Lawrence project probably is closer this year than ever before. But well-organized opposition may force another year's postponement.

WANTS WORK: Walter Reuther, president of United Automobile Workers, preaches the logic of production cutbacks spreading unemployment. Some 600 delegates journeyed to Washington to seek Congressional action to relieve the spread of unemployment in Detroit. They won Washington promises.

(5) More government housing. Limited approval—confined mainly to defense areas—will be voted.

(6) Revision of the Taft-Hartley Act. For the first time in several years, Mr. Truman did not ask for outright repeal. This proposal probably will be passed up in the last-minute legislative rush of June and early July.

(7) Higher farm prices, and lower tax rates for farmers' cooperatives. Plenty of opposition to this one — even from farmers. Farm organizations are opposed to the type of direct subsidies Mr. Truman advocates. Proposed lower taxes for the co-ops appear in a most unfavorable light in view of Mr. Truman's demand for $5 billion in new taxes.

(8) Increase taxes by $5 billion. Not a chance for approval of this request. Even Mr. Truman's supporters concede that the most that can be achieved is a limited closing of some so-called loopholes (oil and gas depletion rates, for example) in the existing tax statutes.

(9) Additional bank reserve requirements, and authority to control commodity exchanges. There is no general support for either of these proposals among members of either party.

(10) Higher Social Security rates. Fact that Congress is obliged to curtail its session (it must finish by mid-July in order to attend political conventions) will prevent action of this lengthy and involved subject.

(11) Federal aid to schools. Some aid probably will be voted as election-year bait.

(12) Federal aid to health services. Limited aid will be voted, but Mr. Truman's perennial request for full-scale socialized medicine will be dumped.

3 Typical Examples of GREATER OUTPUT ...REDUCED COSTS

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***EXAMPLE No. 1:** *130% Greater Production between tool grinds.* Steel pump parts were being machined on automatics. When *Texaco Cleartex Cutting Oil* replaced a competitive fluid, production between tool grinds more than doubled. Moreover, *Texaco Cleartex Cutting Oil* could be used as both coolant and machine lubricant, eliminating contamination and oil wastage.

***EXAMPLE No. 2:** *75% Longer Drill Life.* The job was drilling shotgun barrels. Short tool life was overcome by the Texaco Lubrication Engineer's knowledge of the right *type* of cutting fluid to use. When *Texaco Sultex Cutting Oil* went on the job, tool life nearly doubled and downtime for tool changes was greatly reduced.

***EXAMPLE No. 3:** *Chaser Life Doubled.* In threading stainless steel packing nuts the greatest difficulty was frequent chaser breakage. Change to *Texaco Cleartex Cutting Oil* increased chaser life from three to six shifts. In addition, both steel and brass can now be worked without changing oil. *Texaco Cleartex Cutting Oil* does not stain.

Whatever the metal being worked or your method of machining it, there is a *Texaco Cutting, Grinding or Soluble Oil* to enable you to do the job better, faster, at lower cost. A Texaco Lubricating Engineer will gladly work with you.

To protect oil film roll necks, use *Texaco Regal Oil* — turbine-quality, for bearings in heavy-duty service. Resists oxidation, emulsification, sludging. To prolong life of heavy-duty enclosed gears and bearings, use *Texaco Meropa Lubricant.* Stands up under heavy loads, does not foam.

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EXPANSION: Tax Writeoffs Help

Construction on certificates of necessity at halfway mark . . . About $4.6 billion already in place by Jan. 1 . . . Quota cutbacks caused delays . . . Structural steel seen as easing.

Construction of new industrial facilities for defense production aided by 5-year fast tax writeoffs had nearly reached the halfway mark (or about 46 pct) as of Jan. 1, according to incomplete fourth quarter reports to Defense Production Administration.

This means that about $4 billion in construction of new facilities was already in place as the year began out of roughly $9 billion in approved projects. As of Sept. 30, the percentage was about 35 pct.

More Delay—Most of these projects, or about 95 pct, have been scheduled for completion before the end of 1953. It now looks as if more than had been expected will have to be carried over into 1954.

Reason is a slowdown which began with cutbacks in materials allocations for the fourth quarter and has been continued over into the first and second quarter of 1952. Second and third quarters will be the tightest, DPA officials say.

Although construction accounts for only 31 pct of the total cost, shortages of structural steel have brought delays. Easing of the structurals shortage is indicated by DPA's report that requirements for the second quarter were 173 pct of supply, down from 203 pct last fall.

Must Slow Down—Nevertheless, DPA Chief Fleischmann says, "industrial expansion must be slowed down although allotments generally will support industrial expansion already under way. Military construction must be extended over a longer period to avoid stopping industrial projects."

Machine tools, machinery, and other equipment account for about 66 pct. Held up by shortages of materials and facilities, these items are now getting priority.

In its latest report on certificates of necessity, DPA said that as of Dec. 21, some 5443 certificates had been issued for projects costing more than $11.5 billion. About 69 pct of this amount has been approved for writeoffs.

Most for Steel—Largest single program covers steel facilities with more than $2 billion for steel works and rolling mills and $339 million for blast furnaces.

As of Sept. 30, the steel and rolling mill program was reported about 31 pct completed. Less than 13 pct of the blast furnace capacity had been put into place.

EXPANSION WITH TAX WRITEOFFS

Industry	Total Reported Cost	Reported Value in Place June 30, 1951		Reported Value in Place Sept. 30, 1951		Est. Value in Place Dec. 31, 1951	
	Thousands of Dollars	Thousands of Dollars	Pct	Thousands of Dollars	Pct	Thousands of Dollars	Pct
Grand Total	9,850,386	2,398,162	24	3,491,711	35	4,575,461	46
Pulp Mills	306,677	53,923	18	89,382	29	111,366	36
Paper & Board Mills	157,639	21,258	13	33,240	21	48,162	31
Alkalies & Chlorine	227,477	37,624	17	59,232	26	82,916	36
Industrial Inorganic Chemicals	373,468	39,424	11	67,197	18	86,269	23
Synthetic Fibers	123,588	5,953	5	13,567	11	22,878	19
Industrial Organic Chemicals	182,982	49,972	27	75,389	41	109,941	60
Compressed & Liquified Gases	71,261	14,911	21	20,552	29	31,116	44
Petroleum Refining	630,914	138,567	22	201,343	32	241,574	38
By-products Coke Oven	93,113	17,350	19	23,776	26	32,222	35
Hydraulic Cement	58,288	13,614	23	19,944	34	30,835	53
Blast Furnaces	339,204	20,504	6	39,619	12	63,010	19
Steel Works & Rolling Mills	2,058,986	469,575	23	636,963	31	838,065	41
Primary Refining-Aluminum	586,444	65,354	11	95,585	16	160,678	27
Welded & Heavy Riveted Pipe	184,976	28,121	15	38,199	21	50,976	28
Machinery, except Electrical	229,741	47,638	21	83,900	36	120,605	52
Electrical Machinery	160,208	33,336	21	60,968	38	80,809	50
Aircraft	53,954	9,193	17	26,154	48	36,196	67
Aircraft Engines & Parts	339,496	59,618	18	98,509	29	136,611	40
Aircraft Parts & Auxiliary Equipment	74,733	19,908	27	25,555	34	32,381	43
Railroad, Line-haul operating	1,136,356	583,548	51	765,917	67	941,527	83
Great Lakes Transportation	112,441	23,666	21	31,992	28	45,157	40
Electric Light & Power	652,396	200,893	31	267,440	41	328,687	50
All Other	1,696,094	444,212	26	717,308	42	945,478	56

U. S. Swaps Metals with British

Arrangements between the U. S. and United Kingdom will make possible shipment of 55,100,000 lb of aluminum and 20,000 long tons of tin to this country during 1952, in exchange for an agreement to send 1 million long tons of steel to Britain.

Scrap and pig iron will be included in the total steel tonnage. Steel itself, mostly in ingot form, will form about 80 pct of the supply. The U. S. reserves the option of varying the proportions of steel products and steelmaking materials.

It is planned that no structural or plate steel or steel shapes will be furnished the U. K. Most of the tonnage will be shipped in the last 6 months.

No cut, the government says, will be made in U. S. allocations for the first and second quarters in order to meet British steel requirements.

The aluminum promised represents an increase of 33,060,000 lb over that promised in recent U. S.-U. K. discussions. This increase will be spread evenly over the last three quarters of 1952. By mid-1953, the U. S. has agreed, this aluminum will be replaced.

Tin is being made available on a cash-and-carry basis at $1.18 per lb, f.o.b. Singapore. It was obvious from the tone of the official announcement, telling the results of recent trade talks between President Truman and Prime Minister Churchill, that both nations favor what was called "more normal arrangements" for tin buying.

Industrial Briefs

Announcement — UNIVERSAL DIE CASTING & MFG. CORP., Saline, Mich., will enter aluminum die casting through the purchase of the E. A. Vermere Co., Inc., plant located near the heart of the bauxite mining and smelting district in Arkansas.

Electrical Equipment Order—WESTINGHOUSE ELECTRIC CORP. will provide $350,000 worth of electrical equipment for two ore unloading towers to be installed at the Pennsylvania Railroad's new pier at South Philadelphia. The towers, each to have a capacity of 1200 tons per hr of 150-lb-per-cu-ft ore, are being built by Industrial Brown Hoist Co.

Bloomer Installed — PITTSBURGH STEEL CO., has installed a new 66-in. high lift blooming slabbing mill, second step in a program to expand production facilities by 50 pct. The company acquired Thomas Steel Co. last August, entering the flat-rolled market for the first time. This year the company expects to bring in 100,000 tons of new blast furnace capacity, 500,000 tons of openhearth capacity, and install two mills.

New Research Labs. — WESTINGHOUSE ELECTRIC CORP. plans to build new research laboratories in Churchill Borough, a suburb of Pittsburgh. Negotiations are underway for acquisition of a 72-acre plot of land. The new facilities will replace present laboratories located since 1916 in Forest Hills, another Pttsburgh suburb.

New Sales Office—HEPPENSTALL CO., Pittsburgh, has established an eastern sales headquarters at 734 Asylum Ave., Hartford, Conn. George H. Wurster, former Boston representative, is now eastern sales representative, succeeding Raymond T. Porter, now vice-president of a subsidiary, Heppenstall Co., Detroit. The Boston office has been closed.

Brookhaven Reactor—During 1951, the first full year of reactor operation, BROOKHAVEN NATIONAL LABORATORY, Upton, L. I., N. Y., supplied 270 radioisotopes for shipment to 26 different research organizations.

Plant Completed—Daniel Klockner, Jr., Inc., has completed a new plant at 164 Franklin Ave., Rockaway, N. J., which is now in complete operation, fabricating steel products. The plant is called KLOCKNER STEEL PRODUCTS, INC.; Joseph S. Klockner is president, and Daniel Klockner, Jr., is president of the Sales and Erection Co.

New Location—The new Los Angeles sales office of the PITTSBURGH-DES MOINES STEEL CO. is located at 6399 Wilshire Blvd., Los Angeles. R. C. Boss, from the Santa Clara plant, is in charge.

Powdered Pig—"The Tale of The Powdered Pig" is a new 84-page manual of applications of aluminum powders and pastes. In addition to familiar and unique applications, the book covers physical and chemical properties, testing and evaluation methods, recommended handling and storing procedures. Copies may be obtained by writing to REYNOLDS METALS CO., 2500 S. Third St., Louisville 1, Ky.

Cottrell Precipitator—An order has been placed with Research Corp. for the construction and installation of an electro-static precipitator, by the ST. JOSEPH LEAD CO., Monaca, Pa. The precipitator will be used to clean the flash roaster gases coming from the roasting of zinc pyrites.

New Address—The CONTINUOUS METALCAST CO., INC., has moved its office to 44 Wall St., New York.

"About that suggestion of yours . . ."

New Tube—A new type puncture-sealing inner tube, made of Butyl rubber, has been developed by research men of GOODYEAR TIRE & RUBBER CO. The new tube contains a sealant material of proper consistency to seal punctures. The sealant maintains its qualities at high speeds and high temperatures.

Termination — AEROQUIP CORP., Jackson, Mich., has terminated arrangements with its South-Southwest U. S. distributor, Aeroquip Sales and Engineering, Inc., Fort Worth, Texas. Changing economic conditions and the current rearmament have brought about the shift, it is reported.

Tests Successful—Robert S. Wallach, president of ASSOCIATED DEVELOPMENT & RESEARCH CORP., has announced successful completion of preliminary tests of a new process resulting in better fuel and engine performance of internal combustion engines. The new process is the invention of Dr. Sophia Berkman, a recognized authority on catalysis.

Steel Scrap—According to figures just compiled, THE AMERICAN CAR AND FOUNDRY CO., has collected 19,883 gross tons of steel scrap from its twelve plants during an intensive drive which started in January, 1951.

Assets Acquired—In exchange for common and preferred stock, COLORADO FUEL AND IRON CORP., has acquired all of the assets of the E. & G. Brooke Iron Co. Brooke's operations will be continued as the E. & G. Brooke Iron Div. of The Colorado Fuel and Iron Corp.

Branch Established—HUGHES AIRCRAFT CO., Calif., has established a branch plant in Tuscon, Ariz. The new plant will be devoted exclusively to the production of guided missiles.

Plant Transferred — DECORATED METAL MFG. CO., manufacturers of metal bobbins for nylon, silk and rayon industries, has transferred its plant from Brooklyn to Milltown, N. J.

The new pot lines at the Jones Mills plant of the Reynolds Metals Company add greatly to our country's supplies of aluminum. Note the tremendous copper bus bars required to feed electricity into the "pots" from which aluminum ingots are poured. Thus Revere participates in the government-inspired increase in aluminum production.

It takes a lot of REVERE COPPER BUS BAR to increase aluminum production

• The Government has directed Revere to produce millions of pounds of copper bus bar for the new aluminum plants being put into operation in order to increase the output of this light metal that is so essential to defense. Copper is the ideal metal to carry the heavy currents required for the "pots" that produce aluminum from the ore. Thus aluminum and copper are intimately linked together. Aluminum is used in planes, ships, weapons, missiles, ammunition, and in many other defense applications. Copper, best of all the commercial metals in electrical conductivity, likewise has many vital tasks to perform for our armed forces, afloat, ashore, and in the air.

Revere is glad that its large capacity for the production of bus bar is so valuable in these times; in our long history of over 150 years of service we have always given everything possible in times of our country's need. However, we are regretful that today's government requirements materially limit our ability to fill civilian orders. We look ahead, eagerly and hopefully, to the time when the present urgent demands are met to such an extent that orders for bus bar and other Revere products can be filled more promptly.

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SEE "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

No Easy Radiator Solution Yet

Copperless substitutes flopped badly . . . Industry hit with an estimated 200,000 failures . . . Replacements free to car buyers . . . Think lacquer was overheated—*By W. G. Patton.*

Solving the auto industry's tough radiator problem in the face of the copper shortage is a dilemma. Although little has been said officially about it, estimates place the number of failures of a substitute-type radiator tried by several manufacturers at more than 200,000. Many firms, including big GM, were caught by the failures and are making restitution.

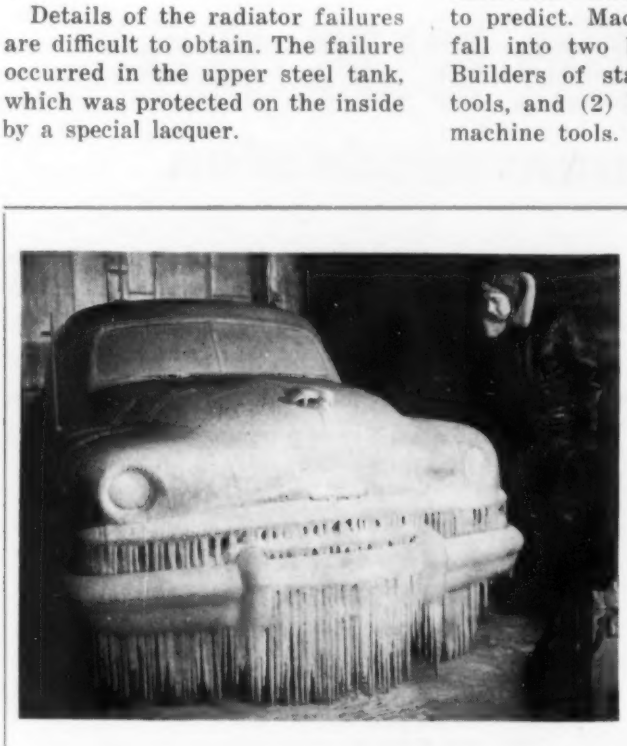
An industry spokesman has explained that failures were anticipated to some extent. At the time the radiators with lacquered steel tanks were installed, several producers said they had no choice but to use the substitute or close down the plant. The industry elected to take a chance—and lost. These leaky radiators are being replaced at no cost to the car buyer.

Details of the radiator failures are difficult to obtain. The failure occurred in the upper steel tank, which was protected on the inside by a special lacquer.

Trade sources report that in soldering fittings the lacquer was overheated. Subsequently, it broke down and corrosion failures occurred within several months. Laboratory tests had showed excellent resistance to many kinds of corrosion. The failures occurred when an attempt was made to put the successful laboratory method into production. The lab tests had indicated good results.

Tool Priorities—Rumors persist that a system of graduated priorities for machine tools will be issued within the next 30 to 60 days. Available information indicates the new regulations have been drawn up and are now circulating in Washington.

Effect of such priorities on the automobile industry is impossible to predict. Machine tool builders fall into two basic classes: (1) Builders of standard machine tools, and (2) builders of special machine tools. The auto industry buys from both types of supplier. If the same priorities are applied to both standard and special machine tool suppliers without changing the present regulations, there may be little change in the status of the order boards of the special machine tool builders. Standard machine tool builders will undoubtedly be importantly affected by the new regulations.



IT'S COLD INSIDE: Frigid treatment is given a Ford sedan to test cold weather starting in cold room of Ford Motor Co. Watching is C. E. Marceau, technician of the testing staff.

Kirksite Dies—Ford Motor Co. has confirmed reports that its engineering test models are being built on Kirksite 3-piece dies. Prototype models of the 1952 model Ford, Lincoln and Mercury were built on Kirksite dies, assembled on special jigs, and engineering-tested before being placed in production. Thus, both the new model engineering and the new model tools were tested prior to going into production.

Auto engineers anticipate fast-growing public acceptance of power steering during 1952, with Lincoln joining Chrysler, Buick, Cadillac and Olds in offering this device to the public. Much experimental work is going forward on the use of power steering for busses, trucks and farm tractors.

Defense — At the Society of Automotive Engineers meeting here last week, Maj. Gen. Francis H. Griswold, military director of the Munitions Board, described the goals set for rearmament.

Gen. Griswold explained that the Munitions Board has set a $5 billion stockpiling program for civilian and military needs. Requirements of the Army include 18 full Army divisions, a Navy of 1000 operating vessels and a 95-wing Air Force. Present aim is to produce enough tanks to equip these forces as rapidly as possible. One-shift production is anticipated. In case of all-out war, three-shift production and a 7-day week is contemplated for greater production, Gen. Griswold said.

ENGINEERING: New Automotive Trends

Society of Automotive Engineers meets . . . Subjects range from substitutions to technical innovations . . . Power steering is hot subject . . . Present papers on boron steels, car springs.

This was auto engineer's week at Detroit. More than 5000 top-flight engineers representing all producers in the industry met here for the Annual Meeting of the Society of Automotive Engineers. The technicians discussed subjects like substitutions for critical materials, cast iron, the Chrysler model K-310, boron steels, magnesium alloys, diesels, combustion chamber deposits, and the new ball joint type suspensions to be employed for the first time in 1952 for front end car springing.

Three papers on the 1952 agenda attracted outstanding attention at Detroit. These were the papers on power steering, Hi-Jet machining and shell molding.

Hot Subject—Power steering is a stimulating subject in the automobile industry today. A highly competitive race has grown up to see who can emerge as the leading producer of power steering devices. Although not new to automotive engineers, power steering seems to be, at the moment, the biggest potential market opportunity for the production-controlled auto industry.

Chrysler adopted power steering a year ago, after the development had languished for 15 years or more in engineering departments of several auto producers. Heavy-off-the-road vehicles, however, have been much interested.

The subject was virtually an untouchable in the passenger car field until Chrysler picked up the ball a year ago. Since that time Cadillac, Buick and Oldsmobile have joined Chrysler in the power steering race. These companies will be joined by Lincoln in the near future. Leading producers of power steering devices are Gemmer Mfg. Co., Saginaw Steering Gear Div., of GM, and Ross Gear and Tool Co., Lafayette, Ind.

One Type—William K. Creson, engineering vice-president, Ross Gear and Tool Co., described the Ross Hydra Power steering gear. In his paper the author describes the engineering details and tells about its operation, installation, adjustments, lubrication and maintenance. Creson explained later that, in addition to the passenger car field, there is great interest in power steering for buses, trucks, farm tractors and many types of military vehicles. Trucks with dual wheels in front or even bogie wheels can be handled successfully with power steering. A substantial increase in payload makes power steering particularly attractive for trucks.

Another paper of outstanding interest to Detroiters was the discussion of the shell molding process, a subject which SAE tackled in open meeting for the first time this year. (See p. 28.)

Dr. Daniel P. Barnard, IV, research coordinator, Standard Oil Co., Indiana, was elected president for 1952, succeeding Dale Roeder, Ford Motor Co.

D. L. Pastell, of E. I. duPont de Nemours & Co., Wilmington, Del., received the 1950 Horning Memorial Award. The award was made for contributions of matching fuels and engines.

New Carburetor for "Rocket"

Oldsmobile's 1952 "Rocket" engine has been boosted 25 hp by the installation of a new quadrijet carburetor which has two complete carburetor systems. Two primary barrels function for starting, warmup and low throttle driving. The secondary barrels go into action when the primary system is operated at half throttle and above. Secondary barrels provide greater breathing capacity for the engine.

THE BULL OF THE WOODS — **By J. R. Williams**

NOW! Industry's most famous electric drill is finer than ever!

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RR Rate Dispute Takes Shape

Roads want intrastate boosts equal to interstate . . . A boost may be truck foothold . . . Bethlehem Pacific plants top all highs . . . Torrance plant shut down—*By R. T. Reinhardt.*

Utah and Colorado steelmaking costs may take a healthy increase if railroads in the intermountain area are successful in convincing Interstate Commerce Commission they are entitled to the same rate hikes for intrastate freight they've been granted on interstate hauls.

Utah, Colorado, Wyoming and Nebraska have so far refused to grant those increases. Commodities involved include coal and iron ores used by Geneva Steel and Colorado Fuel and Iron. Railroads claim they are losing about $2.8 million annually in Utah alone because of the "hold downs" on intrastate rates.

Rates Too High—Hearings will be held in February and March when the four states will argue that rates in the area were already too high when the series of four increases began in 1946.

Primarily raw materials are involved since shipments of finished products usually go into interstate commerce and the buyer is already paying the four increases. Shipments of finished products of both Geneva and C. F. & I. within the states of Utah and Colorado respectively will be affected by the ICC decision. There is talk of using trucks if rates go up.

Beating the Rap—In spite of hand-to-mouth furnace feeding, western steelmakers did right well by themselves and their customers in 1952.

Last week Bethlehem Pacific Coast Steel Corp. reported steel production records broken at each of the company's three plants in 1951. Total output was 830,846 net tons, about 32 pct higher than the previous record set in 1950; Seattle upped its record 17 pct; South San Francisco hit 14 pct better than its former high; and Los Angeles plant topped them all with a 314 pct increase over the best record until 6 years ago. The last is hardly a fair comparison since capacity has been more than tripled as a switch was made from small openhearths to three modern electric furnaces.

Not Good—With customers—including the U. S. Government—crying for steel, the Torrance, Calif., plant of Columbia-Geneva Division of U. S. Steel Corp. was closed down tight again last week with an estimated 8000 tons of steel lost since the firing of two workmen led to the shutdown two weeks ago.

Getting Results—Heavy industry in the West has been doing an excellent job of digging out heavy dormant scrap as management realizes the importance of the project. Other fringe industries are still not too impressed with the emergency.

Western Oil & Gas Assn. has just reported that the California oil industry turned up about 38,000 tons of scrap in 1951 and expects to do as well in 1952.

Columbia-Geneva Div. of U. S. Steel Corp. is reclaiming about 4000 net tons of scrap per month from slag dumps at Geneva.

More Ore Moves Out—While western furnaces scrape around for scrap, iron ore continues to move to Japan in a steady flow. During the past 6 months C. T. Takasashi & Co. of Seattle has been shipping 60,000 tons of ore from Vancouver Island, B. C., per month. Argonaut Co., Ltd., of Vancouver, B. C., a subsidiary of Utah Construction Co., spent about $3 million to develop this deposit on Vancouver Island.

Activity in exploration for iron ore in Nevada and Idaho has been curtailed by a hard winter, but prospects in the latter state looked very good before the snow fell.

There are continuing rumors of a small blast furnace in Nevada to use some of these western ores.

BIG DIPPERS: Two just-completed 75-ton capacity ladles to hold molten steel are on flat cars, ready for shipment to Bethlehem Pacific's Los Angeles electric furnace steel plant.

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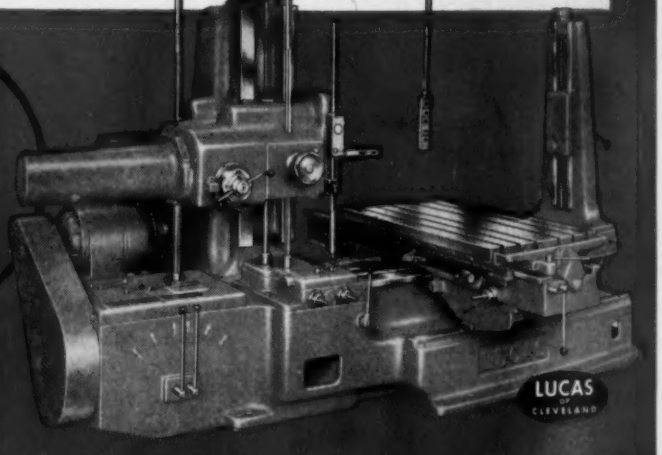

LUCAS *Precision* HORIZONTAL BORING DRILLING AND MILLING MACHINES

LUCAS MACHINE DIVISION, THE NEW BRITAIN MACHINE CO., CLEVELAND 5, OHIO

New Orders Dip but Backlogs Rise

Seeming paradox explained by rate of shipments still lower than new order volume . . . Tool shortage may worsen . . . New orders rivaling backlog coming . . . Amend Z-2—*By G. Elwers.*

In recent weeks, many leading machine tool builders have been experiencing a decrease in their monthly volume of new orders. In some quarters this is being interpreted as meaning the machine tool industry is over the hump—that the machine tool situation is no longer critical.

Not so, say industry leaders. The facts all add up to a continuing and even increasing machine tool shortage in the months just ahead. Worried that Washington may get the idea it can relax its efforts to aid machine tool production, builders point out that even the reduced volume of new orders is still greater than shipments, so backlogs are still rising.

20-Month Backlog—In November, for example, shipments were below $70 million while new orders were nearly $99 million, according to reports to the National Machine Tool Builders' Assn. This group's ratio of unfilled orders to demonstrated production rate is sometimes taken as reflecting the machine tool backlog level.

But although this ratio has dropped occasionally in some months of 1951, the NMTBA says the dollar value of the machine tool industry's backlog has increased in every month since Korea, and is still increasing. The backlog stands above 20 months right now.

Occasional Lulls—The flow of orders for such products as machine tools is never smooth. It is not unusual that there be lulls now and then in the volume of new orders even in the midst of desperate shortage. Looking beyond any current temporary slack in new orders, the industry sees new orders equal to the present backlog in the offing.

According to Washington experts, the industry can expect about $1.5 billion in orders to be placed yet in this fiscal year. This represents a full year's work even at the shipment rate the industry hopes to attain by the end of 1952.

Sorry, Wrong Order—An incredible blunder is revealed by the NPA's recent announcement that an order has been issued which will authorize machine tool builders to use their new Z-2 priority to get materials from warehouses. The Z-2 rating had until this time been good only at the steel mill level.

What conceivable aid the original order was expected to give machine tool builders is hard to understand. A rating good only at the mill level was useless in an industry where most plants are so small they can't afford to buy steel in mill quantities.

"Maybe the keyhole will get 'em to look at it occasionally."

Chiefly Warehouses—A recent IRON AGE survey of machine tool builders showed that more than half buy *all* their steel from warehouses, and all of them buy *most* of their steel in less than mill quantities. Only a few large builders said they bought enough of some steel products, like tool steel bars and structurals, to order direct from mills.

The NPA announcement took many builders by surprise. Unable to imagine they would be given a priority good only at mill level, they had assumed the Z-2 was good at warehouses and had been using it there. NPA's new order, which was released this week, will clear up the situation.

Tools for Neediest—Ever since Korea, the machine tool industry has been advocating and hoping for some sort of plan for distribution of machine tool output similar to the E-1-b of World War II. Such a plan would see to it that each machine tool completed would be shipped to the neediest defense project.

Such a plan, of course, requires that there be a list of all defense projects, kept constantly up-to-date, in order of urgency. Until recently, no such list, covering all services, has been available.

Just Too Secret—Now an overall Defense Dept. urgency list has been made up, and is in the hands of the Munitions Board.

But, the Board told THE IRON AGE, the list can't be used yet to make up a distribution plan, because the information it contains is classified. The Board can't figure out a distribution plan that won't reveal what is on the urgency list.

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PLUS the benefit of 60 years' experience in designing, engineering and molding plastics parts.

How would you like to be able to obtain six or eight *different-looking* plastics parts—using only *one* set of molds?

Fantastic? Not at all . . . General Electric design engineers have created a *basic form* for a radio housing around which a variety of different-looking cabinets can be styled by a simple change of dial knobs, speaker panels or other extraneous parts. The manufacturer of these radios benefits from savings in retooling and mold-making . . . obtains maximum usage from the one set of molds.

This example is typical of the way General Electric's *complete* molding service can help you cut costs in obtaining the plastics parts you need. G.E., one of the world's largest plastics molders, offers you not only tremendous molding facilities but the creative engineering and impartial material choice that can mean low-cost, high-quality plastics parts.

Why not find out more about G.E.'s *complete* molding service? G.E. will be glad to work with you on *any phase* of plastics molding. Just write to General Electric Company, Section M-1, Chemical Division, Pittsfield, Massachusetts.

You can put your confidence in—

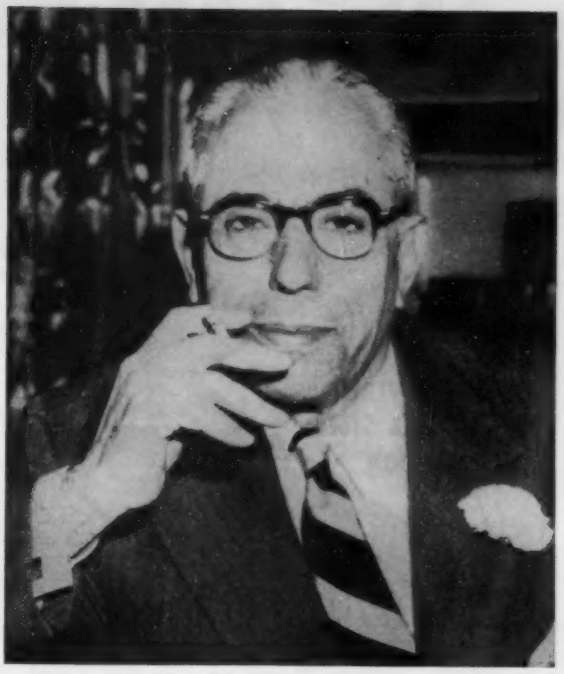
GENERAL ELECTRIC

The Iron Age

SALUTES

Sol H. Friedman

His college education plan for employees' children stems from a deep awareness of responsibility.



WE hear a lot these days about the materialistic outlook and the growing callousness of people in general. Much of this is the echo of hasty generalizations.

In direct contrast are the thousands of unsung and unheard of executives and owners of big and small business who qualify for the title Mr. Citizen. These men are showing anew the businessman's deep sense of public responsibility. They did well by their employees long before that was the fashionable thing to do.

One of these citizens is Sol Friedman, president of Solar Steel Corp. He has the earmarks of the thousands of others. Sol sold his pride and joy several years ago—Reliance Steel. He couldn't stand being out of things so he went back into the steel warehouse business with a bang.

Sol is quiet, modest but a bundle of nerves. What counts with him is action—and results. He gets both because his relationship with his employees is on a warm, personal basis.

Solar Steel workers have a reason for their loyalty to Sol. They have such things as insurance policies, additional pensions and other salary benefits. But Sol is always a step ahead. Recently Solar Steel announced a plan that touched many people deeply.

Sons and daughters of Solar Steel's salaried employees (125) may get a college education paid for up to 90 pct by the company. That includes tuition and other expenses. There are no strings tied to it. Children are registered for the awards while in high school. As the fund grows all of Solar's employees will be included.

The Iron Age

INTRODUCES

Charles W. Lee, appointed vice-president of production, Consolidated Western Steel Division, U. S. STEEL CO., San Francisco. Mr. Lee succeeds Lloyd Earl, who recently resigned.

R. Richard Foster, appointed executive vice-president; Richard Devins, first vice-president; P. R. Sonner, vice-president; L. E. Coffin, vice-president in charge of sales; F. H. Janin and H. E. Blenner, assistant vice-presidents, and J. J. Foy, assistant treasurer, KORHUMEL STEEL & ALUMINUM CO., Evanston, Ill.

Charles K. Olson, appointed assistant general manager, engine division, NATIONAL SUPPLY CO., Springfield, Ohio. P. W. Place, named staff assistant to the general manager; J. D. Myers, general superintendent, and P. A. Groeber, general superintendent, night shift operations.

William M. Wallace, appointed assistant to the vice-president, general machinery division, ALLIS-CHALMERS MANUFACTURING CO., Milwaukee. Elvin R. Danielson, appointed supervisor of priorities succeeding the late Robert T. Ward.

C. W. Wolfe, elected vice-president and district manager, and Karl C. Sippel, elected vice-president, AUSTIN CO., Cleveland.

George W. Jernstedt, appointed manager of engineering, special products division, WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

John T. Ross, Jr., appointed manager of tubing sales, EDGCOMB STEEL CO., Philadelphia.

C. W. Palmer, appointed manager, Toledo, Ohio, plant, NATIONAL SUPPLY CO., Pittsburgh.

W. W. Kovalick, chief engineer, BORG-WARNER CORP., Chicago, named production manager, Ingersoll Products Div. He succeeds J. W. Dean, who has resigned. H. T. Burke, formerly chief tool engineer, becomes acting chief engineer.

Albert K. Papp, appointed sales manager FAIRMOUNT STEEL CO., Cleveland.

Roy D. Chapin, Jr., appointed assistant sales manager, HUDSON MOTOR CAR CO., Detroit.

Daniel J. Haughton, promoted to general manager, Georgia division, LOCKHEED AIRCRAFT CORP. James V. Carmichael, who has been vice-president and general manager, will continue as vice-president.

J. K. Stafford, electric furnace authority, joined ATLANTIC STEEL CO., Atlanta.

Clyde B. Colwell, Jr., appointed district manager, Twin Cities district, U. S. Steel Supply division, U. S. STEEL CO., Chicago.

David S. Burnett, joined DETROIT STEEL PRODUCTS CO., as assistant sales manager, spring division.

Cecil B. Brewer, becomes general sales manager, market development and distribution, GUNNISON HOMES, INC., housing subsidiary of U. S. Steel, New Albany, Ind.

R. S. Eadie, appointed vice-president and manager, Eastern division, DOMINION BRIDGE CO., LTD., Lachine, Que. A. S. Gentles, appointed vice-president, retains position as manager, Pacific division; G. P. Wilbur, ap-

Turn Page

FRED P. BIGGS, elected vice-president, American Brake Shoe Co., New York. He is also president, Brake Shoe and Castings Div.

C. D. KING, appointed assistant vice-president and chairman, Engineering Committees, U. S. Steel Co., New York.

JACK P. PEDERSEN, named vice-president in charge of Warner & Clinton Divs. Clinton Machine Co., Detroit.

Personnel

Continued

pointed vice-presdent, retains title as manager, Ontario division; **D. B. Armstrong**, appointed chief engineer, Eastern division; **R. M. Robertson**, appointed assistant chief engineer, and **P. G. A. Brault**, appointed designing engineer, eastern division.

Laurence E. Chamberlain, assistant manager, will serve as acting manager of sales, plate and shape division, INLAND STEEL CO., Chicago, in the absence of **John J. Bohnen**, who has been given a 6-months' leave of absence to serve as chief of structural shapes section, Iron & Steel Div., NPA.

William I. Campfield, appointed sales manager of building, STEELCRAFT MANUFACTURING CO., Rossmoyne, Ohio.

Dr. John H. Hollomon, named manager, Metallurgy Research department, GENERAL ELECTRIC RESEARCH LABORATORY, Schenectady, N. Y.

August B. Hepp, appointed chief engineer, LOGAN CO., Louisville, Ky. He succeeds **H. R. Gotthardt**, who remains with the company as consulting engineer.

George E. Goodrich, appointed assistant manager, industrial department, Apparatus Div., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Arthur A. Merry, chief tool engineer, PRATT & WHITNEY AIRCRAFT, East Hartford, Conn., appointed chief of advanced tool engineering. **Edward P. Bullard**, named chief of production engineering. **Leete P. Doty**, superintendent, Southington, Conn., branch plant, named superintendent, North Haven branch plant, and **Wildor G. Emond**, division superintendent, machining departments, succeeds Mr. Doty as superintendent of the Southington plant.

R. B. Coleman, joins LAMSON CORP., Syracuse, N. Y., as sales manager. **R. I. Hicks** becomes president and general manager.

Dr. Courtnay Pitt, vice-president-finance, appointed to top-level management policy committee, PHILCO CORP., Philadelphia.

R. E. Bigelow, appointed manager of defense contracts, PORTABLE ELECTRIC TOOLS, INC., Chicago.

FRANK J. ANDERSON becomes manager of sales, San Francisco district, Bethlehem Pacific Coast Steel Corp., San Francisco.

THOMAS J. MOORE, JR., elevated to general manager, Brainard Steel Div., Sharon Steel Corp., Sharon, Pa.

S. S. CORT becomes general manager of sales, Bethlehem Pacific Coast Steel Corp., San Francisco.

NELSON W. DEMPSEY, appointed assistant manager of operations, Chicago district, U. S. Steel Co.

the Iron Age
FOUNDED 1855
Technical Articles

DIRECT REDUCTION YIELDS Variable Density Steels

FIG. 1—Two bars made from same ore and reduced in same way at 1950°F. At left, ore fines used were 25 pct —100 and +325 mesh, 75 pct —325 mesh. At right, 70 pct of —100 and +325 mesh fines, 30 pct of —325 mesh.

by P. E. Cavanagh
Assistant director
Dept. of Engineering & Metallurgy
Ontario Research Foundation
Toronto, Ont.

Fine, prepared ore or mill scale is reduced with coke and limestone in a continuous kiln, yielding plain carbon or alloyed steel. Bars, slabs, pipe and other shapes have been produced with densities of 1.0 to 7.2 g per cc. Hot working follows where desired. At same weight as aluminum, this light steel is weaker but much cheaper. A continuous reduction and swaging unit is under construction.

The Ontario Research Foundation has developed a process for producing useful articles of steel directly from iron ore. The main characteristics are low cost and a wide choice of weight and strength.

The simple process involved was discovered by accident. While investigating the possibilities of producing sponge iron commercially[1], part of the work was devoted to the production of sponge iron suitable for processing into iron powder. To speed up reduction time sponge iron was produced in bars or wedges. Sponge iron bars intended to be ground into iron powder were reduced at a relatively low temperature. They were friable and easily broken up. However, a few bars accidentally produced were so hard, strong and tough that they could not be ground up.

A laboratory investigation was immediately started to try to produce this material deliberately. This did not seem a very promising project, since it is reasonably well known that direct reduction usually gives a density of 3.0 g per cc or less. It was thought desirable to produce a metal with densities of 4.0, 5.0, 6.0 or higher. All past experience suggested that any attempt to obtain such high densities directly from iron ore would result in pieces with the appearance shown in Fig. 1. This cracked and broken piece is not a very useful metal bar.

Experience in producing extruded pellets from

various iron ores[2] indicated the way in which this difficulty could be overcome. The success of the methods adopted is best illustrated by comparing the two bars in Fig. 1. Both bars were made of the same ore and put through the same reduction process. But the screen size distribution of the ground ore was adjusted to provide for the behavior of the individual ore particles during heating and reduction.

Laboratory investigation was then continued to a point where large pilot operation was indicated, Figs. 3 and 4. The use of a pottery kiln in Oakville, 20 miles from Toronto, was obtained in September, 1951, and pilot operation commenced. Since then, investigation of possible applications of this process has been the major activity. This exploratory work is now completed and pilot commercial operations are being undertaken for manufacturers interested in obtaining licenses.

Factors determining steel density

The density of the steel is determined by several factors. Different iron oxides and different ore deposits of the same oxide behave differently during heating and reduction. Some ores will swell remarkably during this process, while others shrink as much as 50 pct in volume. This characteristic of various ores is one of the main factors in determining the final density of the product. The swelling or shrinking characteristics of the ore can be modified by adjusting the screen size distribution of the ground ore. This gives more or less voids in the final product and, therefore, some control of density. Final density of the steel can be increased by carrying on reduction and treatment at higher temperatures and for longer times, Table I.

Carbon content of the steel products is determined by three factors. These are: composition of the reducing gas, reduction temperature and treatment time at temperature after complete reduction has been achieved, Table II. Carbon content and density can, therefore, be separately controlled even with the same ore.

Extrude ore samples for study

Success with the present method depends on a complete knowledge of the behavior of the iron oxide raw material during reduction. In our laboratory studies, samples of ores are prepared in the form of ½ in. diameter extruded rods. A 500-g sample is placed in the capsule of a reducibility furnace, where it is reduced. Weighing, examination and analysis follow. Fig. 5 and Tables III and IV show some of the results obtained with a variety of ores and illustrate the necessity of such preliminary studies. In addition, dilatometer studies of such extruded ore fines can be made at all stages of reduction[2].

If a given ore undergoes a volume increase of 10 pct, it is possible to reduce the amount of swelling markedly. This is done by grinding the ore to a lower bulk density (greater percentage of voids). An ore with pronounced shrinking tendencies can be blended with a swelling ore.

For production of parts with densities of 5.0 or higher, the use of a shrinking ore is indicated. The density of the product obtained from a given reduction process can be further increased by adding to the ore small percentages of salt, metallic iron powder and copper. The salt apparently acts as a cleansing agent. It keeps the reduced surface of the iron particles easily accessible to reducing gas and promotes sintering. The metallic iron takes up oxygen from the reducing gas and promotes faster reduction. This leaves more of the cycle time for sintering. The addition of copper appears to be beneficial for the same reasons as in iron powder metallurgy, when carried out above melting point of copper.

Some unexpectedly high densities are sometimes obtained by blending a swelling ore with a shrinking ore.

For many possible applications of controlled density steel it is obviously necessary to start with an extremely clean and pure iron oxide. The success which has been attained is due entirely to the 3-phase magnetic superconcentrator.[3]

This equipment is in essence the stator of a 3-phase induction motor spread out flat. A travel-

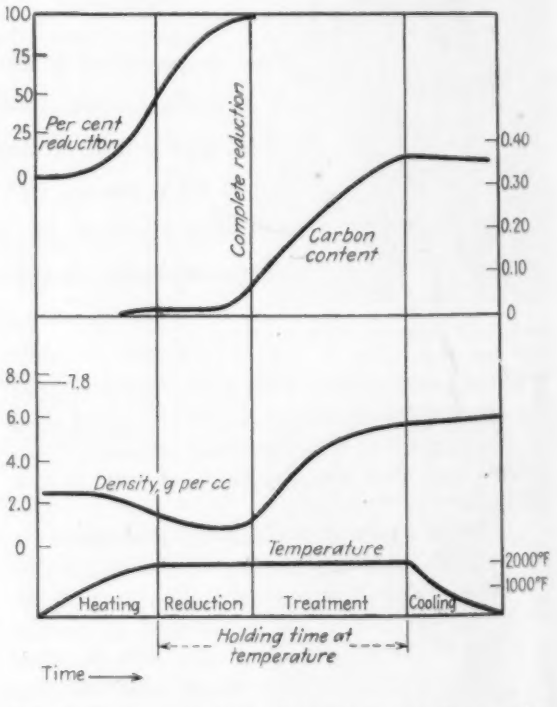


FIG. 2—These curves show only trends in reduction practice. Specific ore characteristics, particle size and distribution, temperature, reducing medium and desired end product would influence actual operation of process.

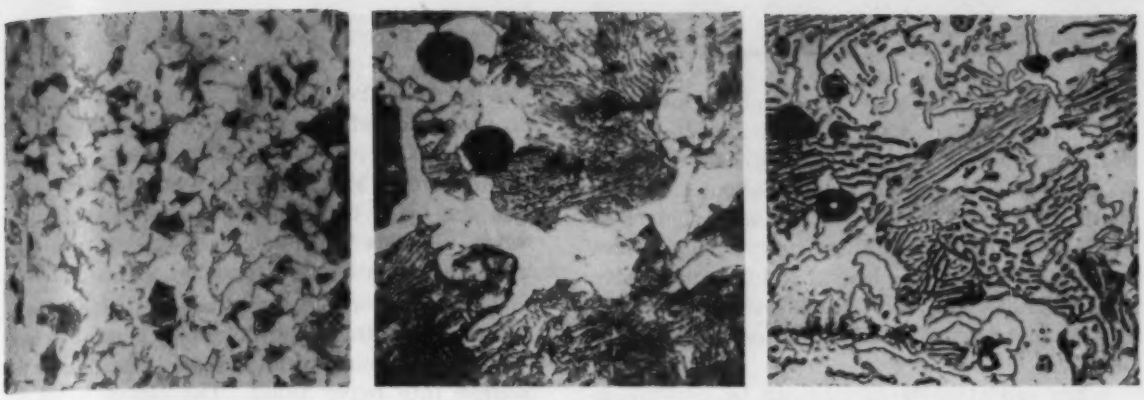


FIG. 3—Typical microstructures of controlled density steel: (1) Carbon, 0.32 pct, density 4.2 g per cc; (2) carbon 0.92 pct, density 5.13 (3) carbon 1.15, density, 6.6. 500X. All made from mill scale.

ling magnetic field is established on the under surface of the magnet. Fine particles of magnetic iron oxide fed underneath this magnet are rapidly transported through the air to the other end of the magnet. In addition to the forward motion of the particles a very rapid spin is imparted to them for the same reasons that an induction motor shaft turns in a similar field.

As long as a magnetic ore is ground sufficiently to free all the particles of gangue, these will fall into the concentrator's tailings bin. Magnetic particles travel under the magnet to the far end where they are dropped out of the magnetic field. In the case of some commercially available magnetite concentrates, one pass will reduce the gangue content materially, even when they are not ground any further.

Mill scale is an ideal raw material after cleaning on the superconcentrator.

When hematites are available at a sufficiently low price it may be more profitable to carry out a magnetizing roast and then to clean the magnetic oxide with the superconcentrator.

The choice between these three materials will be determined by their price, special treatment costs for this process, and the suitability of the particular ore in producing the desired density and carbon content in the finished article.

In many instances, controlled density steel articles are produced in usable form. In such a case the allowable level of impurities such as sulphur, phosphorus, silica or titanium oxide is determined by the service required of the article. The effect of these impurities in normal steel-working processes is not a factor. For example, if a certain part is not going to be hot worked, hot shortness due to a high sulphur content may be of no importance. The allowable sulphur content would then be determined by the mechanical or other properties required in the finished article.

This means that many ores which do not make desirable blast furnace feed, such as pyrite cinders and titaniferous magnetites, are perfectly

TABLE I

DENSITY CONTROL METHODS COMPARED

Method	Ore*	Temperature	Hours at temperature	Density, g per cc
Varying holding time at temperature	−60 mesh mill scale	1950°F	20	2.4
			24	3.7
			30	4.3
			36	4.5
Varying holding temperature	−60 mesh mill scale	1900°F	12	1.75
		1950°F	12	2.6
		2000°F	12	3.1
		2050°F	12	4.0
Ore blending	−60 mesh mill scale	1950°F	24	3.7
	With 25 pct blended fines†	1950°F	24	4.5
	With 50 pct blended fines	1950°F	24	5.3
	−60 mesh mill scale	2050°F	33	4.9
	With 25 pct blended fines	2050°F	33	5.3
	25 pct blended fines and 2 pct NaCl	2050°F	33	6.05

* In all cases prepared ore was charged in 1-in. paper tubes 12 in. long, packed in coke limestone reducer in 12 in. diam metal saggers.
† Fines used were scale from a continuous annealing furnace, all −325 mesh.

TABLE II

HOW CARBON CONTENT* IS CONTROLLED

Method	Temperature	Hours at temperature	Reducer	Carbon content, pct
Varying holding time at temperature	1950°F	20	Coke	0.68
		24		0.95
		30		1.42
		36		1.46
Varying holding temperature	1900°F	12	Coke	0.12
	1950°F			0.46
	2000°F			0.82
	2050°F			1.02
Varying proportions of ore to reducer	2000°F	15	Coke—twice ore weight	0.95
			Coke—equal to ore weight	0.76
			Coke—half of ore weight	0.07
			Coke—third of ore weight	0.03
Varying the kind of reducer	1950°F	24	Coke	0.95
			Coke + 10 pct coal	0.61
			Coke + 20 pct coal	0.38
			Coal†	0.46
			Pack carburizer‡	1.13

* In all cases −60 mesh mill scale was charged in 1-in. paper tubes 12 in long, and packed in solid reducing agent in 12 in. diam metal saggers.
† High volatile bituminous coal.
‡ "Pearlite S" solid carburizing compound.

satisfactory for this process. Steel has a density of about 7.8, depending on its composition and working history. Controlled density steel can be produced in a density range from about 1.0 to 7.2 directly from the reduction furnace. This new engineering material's future applications have been divided into two classes: light steel, density from about 1.0 to about 6.5 and full-density, hot-worked material with the same density as normal steel.

When reduction is carried out by packing in solid carbon, the reducing agent is carbon monoxide generated from the hot carbonaceous reducer. Carburizing compound, coke dust, coal, charcoal, or even sawdust may be utilized as the solid reducing agent. About 10 pct by weight of limestone must be added to most solid reducing agents. This material takes up sulphur and prevents it from being absorbed by the steel. the fine, close-packed coke will now support the ore in the desired shape. It is possible, therefore, to use molds of paper. Such molds char during reduction but produce useable shapes.

Molds must also be porous so that the reducing gas can pass through them to reach the iron oxide. Porous sand molds, graphite and shell molds of resin-bonded sand are all satisfactory.

The tunnel kiln process as carried on at the Foundation's Oakville pilot plant is quite simple. If bars are being produced, the prepared ore is poured into paper tubes. The closed tubes are then placed in a metal container or "sagger" and the fine reducing mix of coke and limestone is added, Fig. 4. A 1-in. layer of reducing mix is placed over the top of the tubes and the sagger is sealed to exclude as much air as possible.

Saggers may be of clay or of alloy metal. They must be gas-tight and able to withstand the reduction temperature. The saggers are placed on kiln cars and pushed into the charging end of the kiln. In larger kilns many saggers can be charged on a single car[1]. When the sagger and contents have cooled down to room temperature, the sagger is opened and the product removed.

The Oakville kiln is 65 ft long and holds 26

TABLE III

EFFECTS OF ORE CHARACTERISTICS, TIME, TEMPERATURE AND REDUCER ON DENSITY

ORE	Iron, pct	Silica, pct	Oxygen Loss, pct	Extruded Density	PER CENT CHANGE IN DENSITY†							
					Hydrogen Reduction				Carbon Monoxide Reduction			
					1850 °F		2000 °F		1850 °F		2000 °F	
					1 hr	3 hr	1 hr	3 hr	1 hr	3 hr	1 hr	3 hr
[2]Cornwall magnetite	60.0	4.3	23	3.15	−24.0	−23.5	−22 5	−23.7	−42.5	−31 5	− 7.6	−28.8
[3]Bene[4]ciated hematite	60.5	9 1	26	2.75	−20.0	−16.0	−27.6	−20 7	−31.2	−27.3	−22.9	−31 2
[4]El Pao	68.5	1.2	26	3.25	−24.1	−19.5	−33.5	−20.2	−83.0	−38.0	−45.0	−38.0
[5]Pure magnetite	72.5	.....	26.5	2.60	+ 4.0	+51.4	+ 7.2	+12 8	− 5.4	+ 7.2	+82.0	+28.0
[6]Steep Rock hematite	54.4	4.0	28	2.70	−14.4	−10.0	−11.3	−16 0	−20.0	− 6.3	0	−11 0
[7]Oliver hematite	54.5	12.5	23.5	2.40	−18 3	−21.3	−13.5	−18.0	−20 2	−16 6	+31 0	−11.5
Pure hematite	70.0	.....	29	2.70	+35.0	+39.1	+48.5	+34 7	+19.6	+38 5	+31 1	+32 4
Hematite 20 pct, magnetite 80 pct	71.3	.....	27	2.60	.....	+19.0	+30.3	+33 0	− 5.7	+ 6.0	+34 2	+26.2

† If no change in sample volume takes place during test, density will decrease by percentage equal to oxygen loss. Swelling ores show greater decrease in density than their oxygen loss. Shrinking ores show less decrease in density than their oxygen loss. Increase in density results when volume shrinkage is more than enough to counterbalance the oxygen loss in weight.

TABLE IV

EFFECTS OF SIZE DISTRIBUTION, PARTICLE SHAPE, GRINDING METHOD ON DENSITY*

Method of grinding	Screen size distribution, pct								Bulk density, g per cc	Surface area	Extruded density, g per cc	Final density, g per cc
	+28	+48	+60	+80	+100	+150	+200	−200				
1. Disc grinder	....	....	0.3	14.9	14.5	13.8	19.0	37.3	2.83	29.8	3.37	6.87
2. Pan mill	....	....	2.5	14.6	15.4	12.6	17.1	37.7	2.68	29.5	3.61	6.30
3. Rolls	....	....	0.3	13.8	17.9	19.8	14.9	33.4	2.68	27.7	3.30	6.06
4. Ball mill	....	....	....	11.0	11.7	22.4	19.7	45.0	2.75	33.3	3.38	5.06
5. Jaw crusher	6.5	57.0	22.7	13.6	....	....	....	....	2.78	6.8	3.21	4.21
6. Screened from jaw crusher	....	100.0	....	....	....	....	....	....	2.64	5.7	3.21	3.67

* El Pao Venezuelan hematite at 68.5 pct iron ground as shown, extruded with ½ pct starch binder packed in coke-limestone reducer in metal sagger and held 24 hr at 2200°F.

cars. It is electrically fired by twelve "Globars" and will hold five carloads at 2300°F. Pushing one car into the kiln each hour provides 5 hr at temperature. A 3-hr push will give 15 hr at temperature.

The main characteristics of the new engineering material provided by this direct reduction process are low cost and light weight. The mechanical properties vary in proportion to density, Fig. 5. It must be emphasized that Fig. 5 shows the minimum ultimate tensile strength as obtained on tensile test bars for one particular analysis in the "as-produced" state.

FIG. 4—Loaded tubes are placed in enameled sagger (at Oakville pilot plant, these are now made of ore directly reduced in desired shape in same kiln in which they are used). These containers' capacity is 24 tubes. When filled with coke-limestone reducer they are ready for reduction. On left, low-density steel bars are being removed from sagger after their trip through kiln.

A peculiarity of the controlled density steel process is that the mechanical properties depend somewhat upon the shape of the finished article. During reduction and sintering operations different thicknesses will reduce and sinter at different rates. This fact must be kept in mind when evaluating the strength of light steel. It is desirable where possible, to measure the mechanical properties of the actual shape rather than those of specially prepared test bars.

The mechanical properties of the very low density material are comparable to those of wood or plastics. At the same densities, the ductility is considerably below that of magnesium or aluminum. The price per unit volume is also considerably lower than magnesium or aluminum.

TABLE V

LIGHT STEEL ANALYSES*

Ore	Additions	C	S	Mn	Si	Cr	Ni	Co	Va
Mill scale		....	0.010	0.39	0.38	....	.....	.....	....
Gallivare magnetite		....	0.005	0.06	0.02	....	.....	.....	....
Mag Iron Co. magnetite		....	0.011	0.06	0.23	....	.....	.....	....
Grangesberg magnetite		....	0.014	0.05	0.06	....	.....	.....	....
Mill scale	Nickel and chromium powder	0.14	0.007	0.17	0.34	2.00	24.14	.....	....
Mill scale	Chromium powder	1.26	0.015	0.36	0.31	0.99	.....	.....	....
Mill scale	Cobalt powder	1.07	0.002	0.39	0.34	....	.....	28.72	....
Mill scale	Vanadium powder	0.75	0.012	0.07	0.87	....	.....	.....	0.03
Mill scale	Nickel and chromium powder	2.42	.....	.....	.....	8.1	5.90	.....	....

* Ores ground to −60 mesh and reduced by packing in paper tubes in a sagger in coke-limestone reducer and holding 36 hr at 2000°F.

As with all design problems, this would be a matter of comparative costs of the two different designs. A study of the costs and mechanical properties of, for example, controlled density steel and magnesium would be needed.

Light steel will rust more rapidly than normal steel but in most uses all steel is protected by paint or plating or enamel. The relatively rough surface of light steel as it comes from the furnace is an ideal surface for painting and particularly for enamelling. It is easy to machine. Nails and screws can be driven into it by hand.

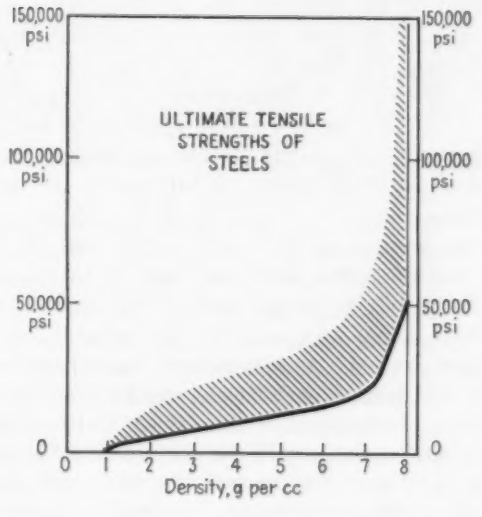


FIG. 5—Solid line represents minimum tensile strength of satisfactory "low-carbon" bars "as produced." Shaded area indicates tensile at any density can be improved by increasing carbon content, heat treating or other means.

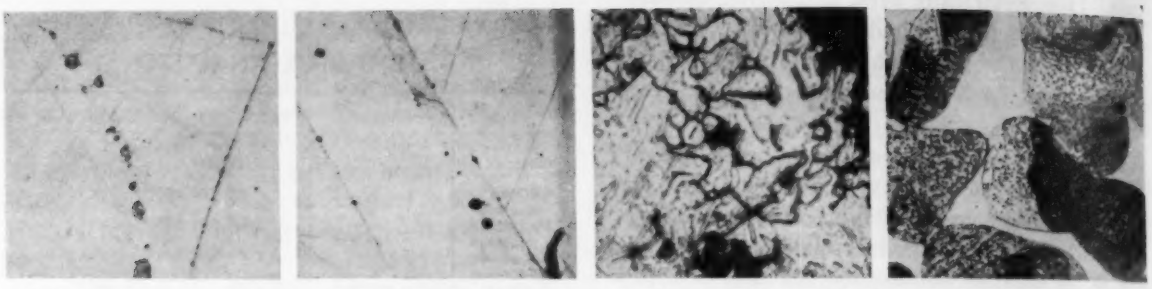


FIG. 6—Types of alloy structures. At left, stainless steel: 0.14 pct carbon, 0.0007 sulfur, 24.14 nickel, 2.00 chromium-density, 5.7 g per cc. Note: inclusions in structure at far left do not occur mainly at grain boundaries. At right, copper-impregnated steel: 1.00 pct copper added to ore. Copper is in grain boundaries (phase contrast). At far right, 15.00 copper added. White constituent is copper in this structure. 375X.

Variable density steels (continued)

As with ordinary steel, alloying, raising the carbon content, and heat treatment can all be used to increase properties at a given density.

With alloying elements such as cobalt and nickel, the metal may be added in oxide form. The oxide will be reduced and the resulting metal will alloy with the light steel during the process. An extensive investigation of methods of preparing alloys is under way and will be reported on later. Fig. 6 shows two alloy compositions and Table V lists some of the alloys already produced.

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Part II of this article will appear next week

Revere installs large water-cooled mold

Economies in casting and processing of brass ingots will result from installation of the world's largest water-cooled slab mold at the Revere Copper & Brass Co., New Bedford, Mass.

Built by the Machine Div. of Torrington Mfg. Co., the JM-61 mold weighs over 40,000 lb, stands 8 ft high. An 8000 lb Muntz metal slab can be cast. The mold is designed so that eventually a slab 10 in. thick, weighing 10,000 lb can be cast.

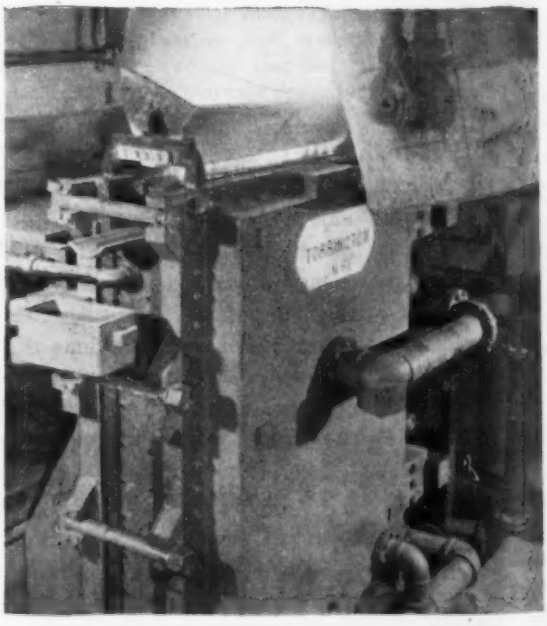
In production, a runner conveys molten metal from a 22,000-lb induction furnace to the mold.

Other types of brass for rolling have been cast in similar smaller sized molds, and, during the past 10 years, have been cast in 1 ton cakes for items like cartridge cases, shell bands.

Outstanding feature of the JM-61 is its water cooling system. A honeycomb-shaped compartment lies behind each of the mold's 3-in. copper plates. As the mold is filled with molten metal up to 4000 gal of water per minute runs through these compartments to cool the mold and carry off heat from the cast bar. The water's temperature rises only 10 degrees in passage.

Larger cakes of brass will be available. Delivering an 8000 lb cast, the JM-61 effects savings in labor and speeds production.

Overall, the JM-61 is 8 ft wide, 4½ ft thick and 8 ft high. Mold cavity size is 50 in. wide, 8 in. thick, and 6 ft high.



MOLTEN METAL is poured into 8000-lb capacity water-cooled mold at Revere's plant, New Bedford, Mass.

Wanted: Diamond Tool Standards

By H. L. Strauss, Jr. Technical Director, National Diamond Laboratory New York

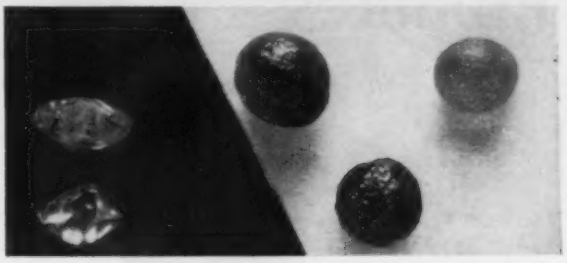
Industrial diamonds and diamond powders are becoming alarmingly scarce. They are widely used and they are expensive. Their conservation is of paramount importance if industry is going to continue without disruptive delays. Some delays have already been caused by lack of an integrated dimensional study of the diamond tool nib itself.

There is a great variety of nib sizes. Good examples of inconsistency are: The Black & Decker Mfg. Co.'s automotive valve seat grinder which used a ⅜-in. SAE thread, and K. O. Lee Co.'s valve refacer which uses a 5/16-in. thread, and the Cedar Rapids Engineering valve refacer which uses a ½-in. thread. The end use of these tools is almost the same but the diamond holders differ. This means that for companies having more than one brand of machine, interchangeability is impossible and conservation suffers.

Just part of program

The difference in machine manufacturers' nib sizes is one segment of the standardization problem. Nomenclature and difference of diamond weight for the particular grinding wheel or grinding conditions must be considered when ordering diamond tools for between-center machines and various types of surface grinding equipment. At this point critics will say that for every grinding job a different wheel is required —having different hardness, grain size and grit size—to which the author agrees. Therefore, different sized diamonds would be required. However, a group of generalizations can be made to promote some understanding of the problem as a beginning. As experience increases, more complex standards can be used.

Unfortunately, industry has made little attempt to learn diamond tool technology. Diamond tools were never the pressing problem they are today; it is quite understandable that the integrity and technical knowledge of the vendor was considered sufficient for most manufacturing concerns. Today, the situation has so radically changed that in many cases the vendor or diamond tool maker is so overloaded with work that he cannot spare the trained men to take care of all the requests that are piling up in his organization. Therefore, it is now up to industry to help itself and gain some basic knowledge of diamonds and their nonenclature and be able to tell the diamond tool vendor what it requires. Heretofore, the diamond tool vendor has had to tell industry what it should have.



WHEEL DRESSING diamonds. Irregular tool stones, left, are used for heavy duty grinding wheel dressing. Ballast type diamonds, shown at the right, are used for dressing large hard open-grained wheels.

Many changes possible

Some comparisons between present and suggested standards on grinding machines are shown in the accompanying box. These are just a few of the changes that could be made. In some cases machine manufacturers will object to changing a nib size with the claim that he will also have to change the fixture design on the machine. However, there are many cases where fixture designs do not have to be changed, and if a change is required it is relatively minor. It is quite possible for a company to use a 5/16 in. holder in lieu of a ⅜ in. holder, as shown in the last two examples in the box on this page.

Tools for surface grinders can easily be standardized from a diameter of nib standpoint. For special application jobs, the operator of a particular machine may want to use a shorter diamond tool than supplied to him. This can easily be done by turning away the length of the wheel dressing nib. However, the operator is often loathe to turn a dimension on a diamond tool for fear he may hit the diamond, if it be of an irregular shape. Therefore, it is important to standardize diameter of nib if not length.

Diamonds themselves can be classified as to general appearance by transparency or opacity, number of flaws or carbon spots and by shape.

Some Suggested Standards

MFR.	TYPE MACHINE	DIMENSIONS, IN. PRESENT	SUGGESTED
Abrasive Machine Tool Co.	Surface grinder	7/16 x 2	7/16 x 2
Browne & Sharpe Mfg. Co.	No. 2, 3 and 4 Universal	½ x 4	7/16 x 4
Edward Blake & Co.	Top grinder	⅜ x 4	7/16 x 4
Bryant Chucking Grinder Co.	Internal Grinders No. 24 Series	7/16 x 1⅝	7/16 x 2
Brown & Sharpe Mfg. Co.	Tool grinder No. 13	5/16 x 1-1/16	5/16 x 1
Norton Co.	Buroway	⅜ x ⅞	5/16 x 1

Cold Header Produces COMMUTATOR SEGMENTS

by Herbert Chase
Consultant
Forest Hills, N. Y.

Cold heading is Ford's answer to the problem of producing copper commutator segments. These small, intricately-shaped parts are needed in large quantities at low cost. Ford's production method enables five men to turn out 100,000 segments in an 8-hr. shift. Good parts are separated from scrap by machine.

Cold heading is Ford's solution to the problem of producing commutator segments. Needed in large quantities, these copper parts for dc motors and generators have an irregular shape which makes them extremely difficult to produce. Ford's method produces segments rapidly, with a minimum of labor and a minimum of material wasted as scrap.

Most of the work is done on cold heading machines and trimmers that operate automatically and at relatively high speed, with comparatively little attention. This makes for low labor charge. Production of segments is handled in the cold heading department of the frame and cold heading plant at the River Rouge plant.

This department has scores of other cold heading machines, most of which are for the production of bolts, screws, rivets and other parts fabricated from steel. Having the commutator headers in this department puts them in excellent position for service and efficient operation.

The copper employed is a commercially pure annealed coiled strip 0.680 in. wide and 0.200 in. thick. This stock is first fed through a pair of rolls that convert the flat stock to a double wedge section 5/32 in. thick at the edges, which are slightly chamfered, and 3/32 in. thick at the center.

Stock thus formed is sheared into 2½-in. lengths, as shown in A, Fig. 1. The cut-off piece next receives a notch on one end and a mating tongue on the other, as in B, Fig. 1. This is done in the side motion of a die in an open die Manville header. The first heading blow upsets the piece so that it has the shape shown at C, Fig. 1. In the second blow, the piece is further upset to the shape shown at D, Fig. 1.

Upsetting not only forms the side projections

FIG. 1—Steps in the manufacture of commutator segments at Ford. A, rolled stock. B, after notching and shearing. C, after first heading blow. D, after second heading blow. E, after trimming and severing into two segments. F, four small pieces represent total waste scrap. Special machine developed by Ford separates good parts from scrap.

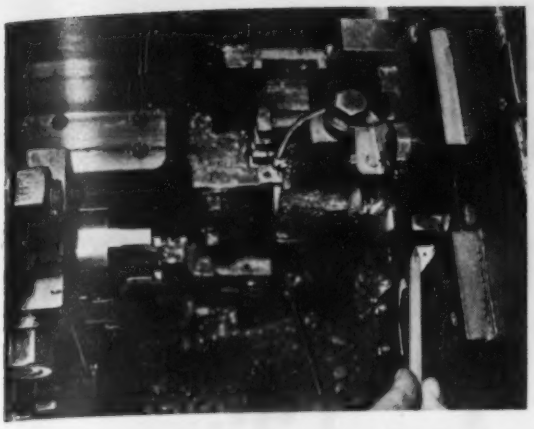


FIG. 2—Setup in open die header. Pencil points to dies which are open to permit stock feeding. Shearing and two heading blows are operations in this machine.

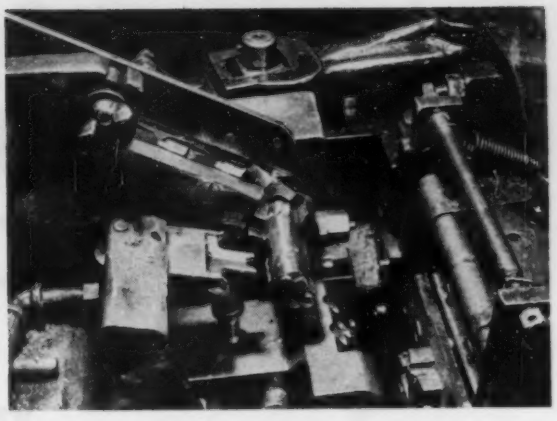


FIG. 3—Setup which performs trimming and severing on slugs as final operations. Hopper is at left center. In foreground on left is pickoff with segment shown in it.

but substantially increases section thickness except along the center line. A rocking knockout ejects the piece. These operations are performed at the rate of 60 pieces per minute in the setup shown in Fig. 2.

Upsetting gives the piece the desired wedge-shape section and a part of the desired contour. It remains to finish trim the wide end of the piece and to shear a small amount of metal from the notch at the opposite end.

Finally, the piece is sheared longitudinally into two halves which are shown at E, Fig. 1. During this final trimming and severing operation in which the two separate segments or halves are made, four small particles of scrap also are removed. These are shown in F, Fig. 1.

These trimming and severing operations are performed in Waterbury-Farrel trimmers, equipped with dies that are hopper fed. The setup is shown in Fig. 3. From the hopper, the parts slide down an incline or magazine. At the bottom, they are picked off one at a time by a rocking arm which moves the piece to trimming position in the die. The punch is then advanced by a slide and performs the trim operations, also shearing the piece into two halves.

Below the die is a gate that is rocked in synchronism with the die and is so arranged that most flash falls to the rear. The finished parts, mixed with some scrap, fall to the front. This partially separates parts and scrap. They slide down separate chutes, into separate tote boxes. This machine turns out about 60 pairs or 120 finished segments a minute.

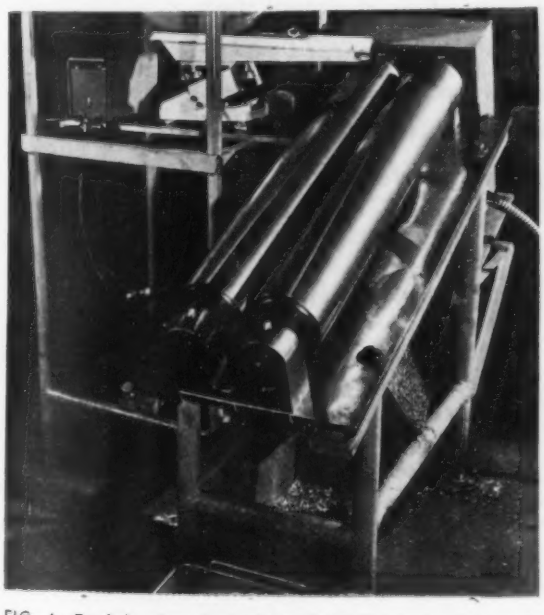


FIG. 4—Ford-developed machine which separates segments from scrap pieces. Hopper and Syntron feed the rolls. As rolls turn, scrap drops through. Segments, too big to drop through, ride rolls and drop into box at bottom.

Unique machine separates scrap

Finished commutator segments and scrap which has not been removed during the trimming operation are completely separated by a unique Ford-designed sorting and inspection machine, Fig. 4.

A Syntron vibrator on a chute carries the segments and scrap from a hopper to two inclined rolls. These are spaced just far enough apart for the scrap particles, but not properly sized segments, to drop through. The rolls rotate in an outward direction.

Scrap is collected in a pan under the machine while the finished copper segments are carried to the end of the rolls and drop off into a tote box. This automatic inspection and scrap removal machine sorts approximately 100,000 pieces in 8 hr. It replaces former visual inspection and manual sorting operations.

Copper segments then are placed in an inclined tumbling barrel where tumbling action removes burrs and sharp edges. This operation prepares the finished parts for delivery to the commutator assembly department.

Besides the machine for rolling the strip stock, there are three heading and three trimming machines and a tumbling barrel. It requires a total of only five men to produce approximately 50,000 pairs or 100,000 finished segments per 8-hr shift.

FAST QUENCH OIL

Improves Hardenability in Aircraft Steels

By James McElgin
Manager, Metalworking Dept.
E. F. Houghton & Co.
Philadelphia

Maximum hardness penetration in thicker sections of aircraft steels and in "shallow" side alloys is possible with new high speed quenching oil. Aircraft parts makers find less trouble in meeting compulsory hardness specifications. Quenching speed of the oil increases slightly after being in service. Performance characteristics compared.

Rigid specifications for many military aircraft parts call for usual care in the heat treatment of aircraft steels to attain required strengths and hardnesses. Specification MIL-H-6875 sets up rigid procedures for heat treating, and a close range on end results.

Development of a high speed quenching medium, Houghto-Quench K, has enabled plants in which the oil was tested to meet specified strengths and hardnesses in thicker cross sections even where alloy content of the steel is on the low side.

Procedure controls under MIL-H-6875 leave the choice of atmosphere, salt bath or lead bath heating to the discretion of the parts manufacturer. During operation all sections of the furnace must be within 25°F of desired heat treating temperature after the charge has been brought to correct heat. At no time may the temperature in any part of the working zone exceed the permissible temperature of the steel being treated.

From the standpoint of the manufacturer who may stand to have numerous rejected parts because of insufficient hardening on the quench, paragraph 4.4.2 of the specification is of special interest. It reads as follows:

"Steel products and parts which are being heat treated to develop tensile strengths in excess of 135,000 psi shall, in the "as quenched" condition.

exhibit hardness in excess of the minimum indicated in Fig. 1, at the midpoint of the thickness section. The minimum of the carbon range permitted by the respective steel specification may be used in determining the minimum hardness from Fig. 1."

Hardness values permissible at the center of the thickest quenched section are shown in the Table. Hardness is near the minimum when the alloy content is near the low limit of the steel specification, and highest when alloy content is near the upper limit.

The hardenable distances, (col. 3 and 4) are reflected in maximum bar diameters (col. 5 and 6) sufficiently hardenable to meet the specification under varying conditions of alloy content. On heat treated articles the bar diameter would be represented by maximum section thicknesses.

Difficulties arise in hardening a heavy article if the steel is on the low limit side in alloy content. Parts made from 4130 or 8630 steel might not harden sufficiently if more than ¼ in. thick. The same could happen in sections of 3140, 4135, 4640, 8735, or 8740 steels more than ½ in. thick.

Such requirements can be met with Houghto-Quench "K," a quenching oil developed about 2 years ago and tested under production conditions in selected companies. Those tests have proved the stability of the oil over extended periods of severe use.

High speed quenching Fig. 2 is the result of additives supplementing the base mineral oil. In most instances, these additives are absorbed or otherwise dissipated after brief service. As a result the former high quenching speed of the oil is reduced to the speed of the straight mineral oil base.

In the oil studied the reverse has been true

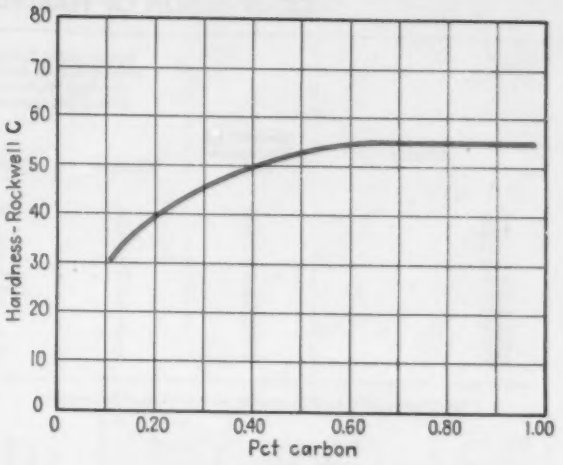


FIG. 1—"As quenched" hardness versus carbon content.

in numerous cases, the oil having increased in speed slightly after being in service.

One of the earliest instances in which this oil was given a real production test was in the shops of an aircraft landing gear manufacturer. The company made landing pistons and parts.

Insufficient hardness in 4130, 4140 and 4340 steels was remedied by a change to the new quenching medium. Increased hardness of 4 to 5 points on the Rc scale resulted—more than enough to meet specification requirements. For 18 months this company has obtained uniform results, using three quenching systems, each of 4000 gal capacity.

The oil has been used successfully in several Cincinnati Flamatic Hardening installations.

The only other suitable quench was water. Hardness benefits of the water quench were offset by distortion and cracking. The new quench-

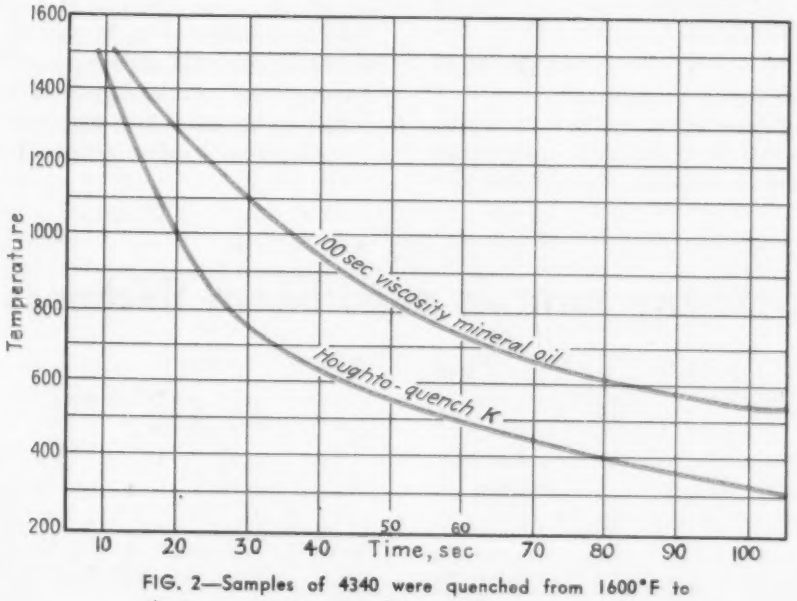


FIG. 2—Samples of 4340 were quenched from 1600°F to obtain comparative quenching speeds.

COMPARISON OF HARDNESS DEPTH—AIRCRAFT STEELS

STEEL*	Minimum Rc Hardness at Center	Hardenability Range, Sixteenths of an Inch to Specified Hardness Jominy End Quench		Oil Quenched Bar Size (Converted from Jominy Test) Maximum Bar Size		Maximum Bar Diameter for Oil Quenching	
		Minimum	Maximum	Steel of Min. Alloy Content	Steel of Max. Alloy Content	100-Second Mineral Oil	Houghto-Quench "K"
3140	50	3	14	7/16"	2½"	7/16"	¾"
4130	45	2	6	1/8"	1"	1/4"	½"
4135	48	4	13	9/16"	2½"	9/16"	1"
4140	50	6	20	1"	3½"	1"	1 7/16"
4150	53	12	Over 32	2 3/16"	4½"	2 3/16"	2½"
4340	50	13	Over 32	2 3/8"	4½"	2 3/8"	2¾"
4640	50	4	10	9/16"	1¾"	9/16"	1"
8630	45	2	5	1/8"	¾"	1/8"	½"
8735	48	4	10	1/4"	1¾"	1/4"	½"
8740	50	4	12	9/16"	2½"	9/16"	1"

* Specification MIL-H-6875 requires oil quenching of these steels.

Fast quench oil (continued)

ing medium produced required hardness values without the ill effects of the water quench.

In one such installation at an aircraft parts plant the oil is used successfully in heat treating 1141, 1137 and 1045 steels. A tractor piston rod made from 1137 steel is heat treated at 1450°F to 52-57 Rc. The 1141 and 1045 steels are made into a body selector spool. The 1141 is heat treated to 52-57 Rc and the 1045 to 50-52 Rc. Generally speaking these parts are thin sections and harden fairly easily.

Performance characteristics of the new oil compared with a 100-second mineral oil were studied. Quenching speeds were measured with 1 in. x 3 in. bars of SAE 4340 steel, quenched from 1600°F. Two tanks of each oil were used, the temperature of one ranging from 85° to 100°F, and the other from 120° to 140°F. The average of the two is shown in Fig. 2.

A Jominy End Quench test, not normally used for measuring quenching media performance, gave results indicating the depth of hardness necessary in meeting the specification. For the same hardness the new oil shows Fig. 3 an increase of 1½ to 2 sixteenths over a 100-second mineral oil. Both oils used in this test on SAE 8740 steel were at 120°F, the water being at 75°F.

In use the new quenching medium increased the Rc hardness by 3 to 5 points over other quenching oils when hardening critical diameters

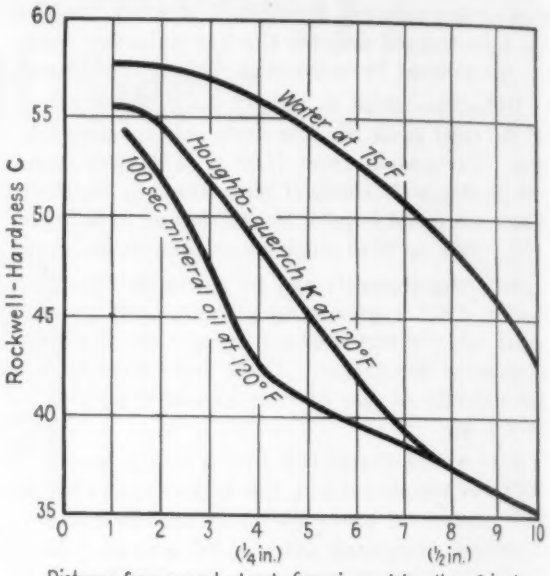


FIG. 3—Jominy test results on SAE 8740 steel.

of steels with low hardenability due to low carbon content or to "low side" alloy content.

On the basis of the Jominy test, an extension of the hardness by 1½ to 2 sixteenths means that an additional ¼ in. can be added to a bar diameter or cross section (see Table) which can be quenched to the required hardness. These additions increase the maximum bar diameters for steels with alloy composition at the lower limit.

Beta ray controls paperboard thickness

Closer control of thickness of paperboard and other strip materials is possible with use of beta ray gages. A recent trial installation at the plant of Fibreboard Products Inc., Antioch, Calif., successfully monitored thicknesses of paperboard produced at the rate of 250 sq ft per min.

Uniform thickness in fibreboard is necessary for efficient folding in making paper boxes. With this in mind a trial gage was installed on a paperboard machine making bleached board for food containers.

The gage, installed by General Electric, proved successful in preventing off-thickness runs. It also aided in setting up new runs more quickly. The gage is simple in operation and may be used by machine operators without difficulty.

LOW-COST ATOMIC FURNACE

Important Research Tool

Industry and research organizations will be able to afford low-cost, low-power atomic furnaces similar to the plant designed by North American Aviation. Production of "tagged atoms" will spur research. Design prevents reactor from destroying itself. Neutron production can be controlled by operator.

A LOW-COST, low-power, non-military atomic "furnace" has been designed by North American Aviation for research purposes. The small reactor puts a potent research tool within the pocketbook of many industrial and research organizations.

The reactor was designed by the aircraft company's Atomic Research Dept. at Downey, Calif., for the Reactor Development Div. of the Atomic Energy Commission. Component development and testing will be completed by mid-1952.

Uranium is used as fuel. The reactor has a relatively low energy-release rate—equivalent to 160 kw and can be operated 8 hr a day, 5 days a week, for 10 years on a single uranium charge. It can be used safely in the center of any metropolitan area. It is estimated the reactor can be built for $1 million.

Frequent disposal of radioactive residue is unnecessary. At the end of 10 years the spent fuel, highly radioactive, may be removed from the reactor, slipped into a thick-walled container and shipped to a reprocessing site.

Automatic devices trip safety rods and shut down the reactor should the power begin to rise rapidly. The reactor has a negative temperature coefficient of reactivity. As the temperature inside the reactor rises, neutron production decreases, making it impossible for the reactor to destroy itself.

Much important research could be done on the West Coast if short-lived isotopes or "tagged atoms" were available. Currently, isotopes must be shipped to the West Coast from AEC facilities at Oak Ridge, Tenn., or the Brookhaven National Laboratory, N. Y.

Isotopes with a life of only a few hours, have lost much of their strength by the time they arrive. Sodium-24 has a half life of 14.7 hr. In that time it loses half its radioactivity. Allowing for packing and air transportation of 2000 to 3000 miles, use of such an isotope on the West Coast is marginal at best. Those with shorter lives must often be ruled out completely. There are some 40 short-lived isotopes of potentially great value to industrial organizations.

Isotope production would require only a fraction of the reactor's capacity. Facilities would then be available for other experimental work. North American Aviation's program could use 25 pct of the reactor's available facilities.

Two types of experiments are possible. The "in-pile" type uses the neutron flow inside the reactor. In the second type, a neutron beam is led through a port in the shield to irradiate objects outside the reactor. The reactor can also be used for experiments on reactor development and for training of personnel.

The octagonal reactor stands 11 ft high, is 19 ft wide and weighs over 450 tons. Its core con-

sists of graphite and enriched uranium sealed in a gas-tight aluminum tank. This is surrounded by 34 tons of reflector graphite. On top, bottom and six sides, of the reflector are several feet of concrete to shield personnel from radiation. The reflector graphite is continued beyond a bismuth shield which stops gamma rays (X rays) but not neutrons, to the other two reactor faces.

A removable cadmium and lead shield at these latter faces provides access to thermal, or "slow" neutrons diffusing through the graphite. This arrangement is called a thermal column. The shield at the top of the core is also removable so that the core may be removed and replaced with the aid of an overhead crane. The operator can limit the reactor power by moving the neutron absorbing cadmium control rods in and out of the core.

Operation of the reactor is based on the behaviour of neutrons—electrically neutral particles which are a part of the nucleus of all atoms. Usually they remain locked inside the atom's nucleus until released by a high energy gamma ray, alpha particle or another neutron.

Free neutrons can be captured by the nucleus of another atom to form a heavier atom of the same element. When this occurs, this heavier atom may emit an electrically charged particle to form an atom of a different element. This "decay" is the atom's radioactivity. Sodium metal can be converted to magnesium and platinum to gold—both highly impractical methods of large scale production. This neutron capture process is used to make radioactive isotopes, the "tagged atoms" of all elements. These "tagged atoms" are important research tools.

Another experimental use permits a neutron beam to leave the reactor through an opening in the shield so that objects outside the shield can be irradiated. Such beams can be used for medical research, as in the treatment of cancer.

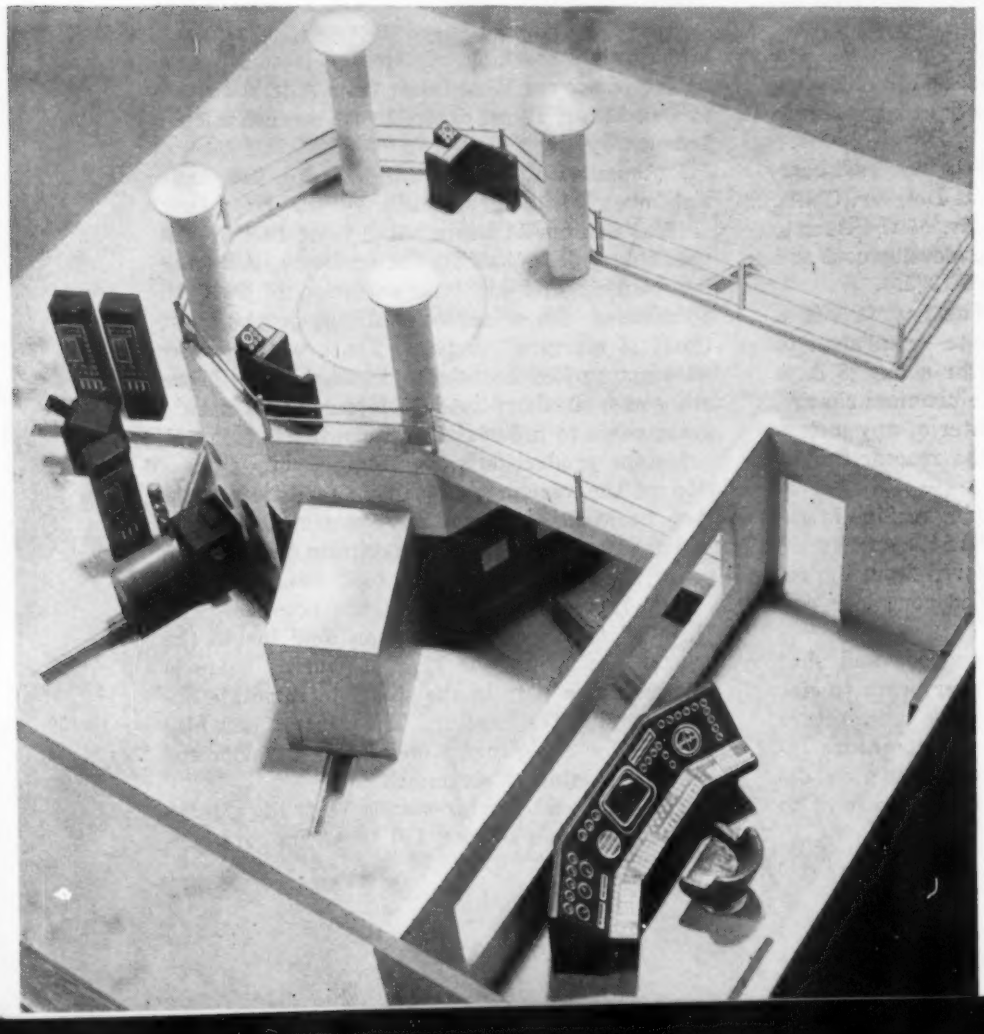
"Tagged atoms" which can be traced, are helping to provide the answers to "why" certain known chemical or biological processes occur.

In cancer research investigators trace the full course of a cancer-producing chemical and its products through the bodies of rats by tagging the chemical with radioactive carbon. More than 100 chemicals have been found in this manner to be damaging to cancers in animals.

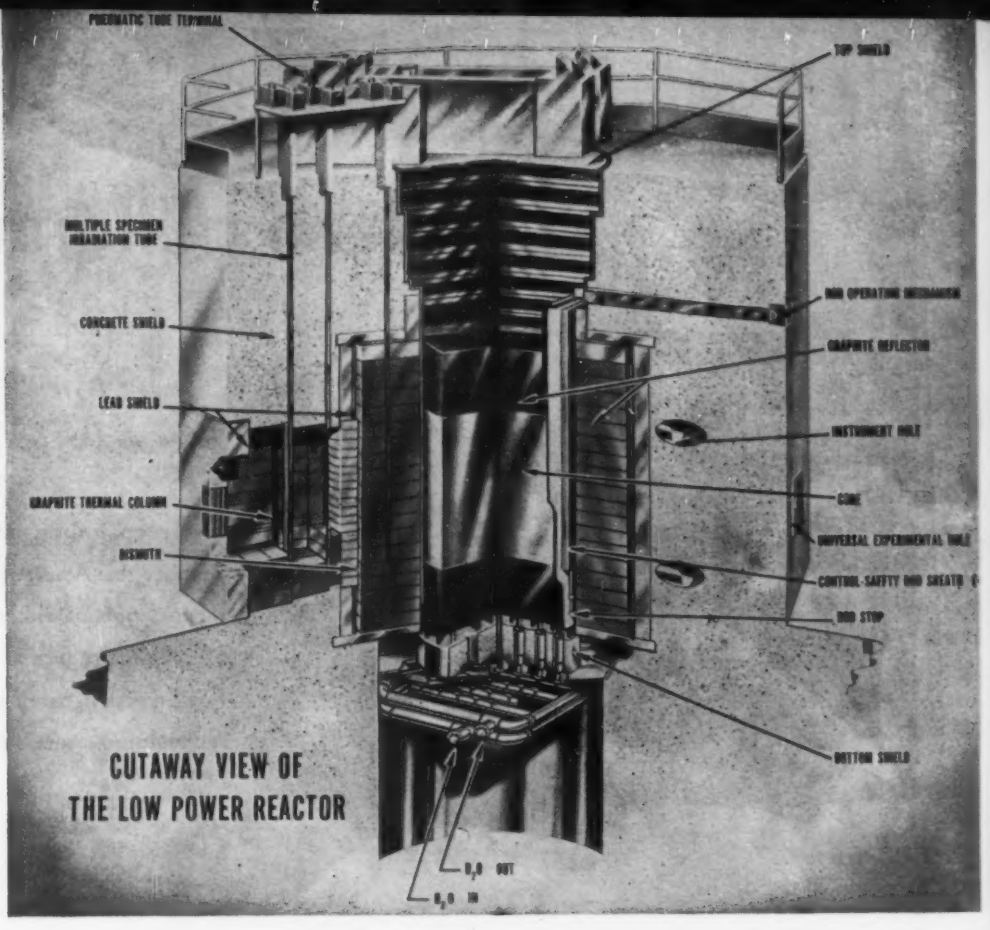
The Bureau of Reclamation, to further develop and conserve the West's water resources, used "tagged atoms" to trace the course of weed-destroying substances in vegetation. Chemical deterioration processes in concrete, and the location and volume of water seepages in irrigation canals and ditches were studied.

In the fuel of a nuclear reactor, "fission capture" provides the means for sustaining the chain of fissions. Free neutrons moving with thermal velocities called "slow" neutrons, although their speed is about 4000 mph are effective in causing fission of uranium-235.

Each fission also releases between two and



MODEL OF LOW POWER atomic reactor shows control station and other equipment. Furnace can operate 10 years, 5 days a week, 8 hours a day without recharging.



LAYOUT OF CORE, graphite reflector, control rods, shields and cooling system are shown in this cutaway view.

three neutrons which can be made available to induce fission of additional uranium-235. If the quantity of uranium-235 is equal to or greater than a minimum critical size, a self-sustaining chain reaction may be achieved. So-called "fast" neutrons, whose speed is about 10,000 times greater than the slow neutrons, can also cause fission. An example of a nuclear reactor using "fast" neutrons is the atomic bomb.

Once the "critical mass" of uranium-235 is assembled, and the chain reaction started by inserting a neutron source, such as a mixture of radium and beryllium, fresh neutrons will be produced by fission. These neutrons will be lost, in general, in four ways: by non-fission capture in uranium-235; by capture in impurity atoms, including the uranium-238 which may be present in the fuel; by escape outside the reactor core; and, of course, by fission capture in uranium-235.

The balance between the rates of neutron production and loss may be measured by a reproduction factor, k. If k is less than one, the chain reaction will eventually stop. If greater, the reactor will "run away" unless neutron absorbers —the control rods of cadmium—are inserted to capture the excess neutrons. At k equal to exactly one, the reactor operates at no net gain or loss of neutrons, at the fission rate determined by the control rod setting. (The fission rate is equivalent to the reactor power level.)

If, in this condition, a neutron absorber is placed in the reactor, k will drop below unity and the chain reaction would eventually stop if the control rods were not pulled out to increase the production of neutrons.

To reduce absorption in the fuel itself, the reactor uses uranium enriched in uranium-235. The concentration of this isotope in natural uranium is about 0.7 pct. Additional neutron conservation is supplied by using a "reflector." In the North American reactor, a layer of graphite surrounds the fuel and conserves straying neutrons by reflecting them back to the core.

Power produced in an atomic furnace appears as heat in the fuel and its surroundings. It is necessary that the reactor be cooled. Heavy water passes through a closed cooling circuit, along which the heat is removed. Heavy water is used rather than ordinary water because the deuterium of which it is made absorbs fewer neutrons than the hydrogen in ordinary water. The costliness of heavy water makes a once-through cooling system impractical. Instead, the cooling water is re-cycled, following the removal of heat. The secondary coolant is light water.

A power reactor used to "generate" electrical power would operate at about 1000 times the power of the North American unit. Operating at 160 kw the low power unit will provide for a flow of 6000 billion neutrons psi, ample for a wide variety of experimental purposes. This flux is available at the exposure holes which end at the surface of the reactor core. About 24 such holes may be fitted around the core for experimental purposes. At least one of these may have an 18-in. sq cross section.

GLASS BAGS clean california air

By Paul Siechert
Chief Engineer
Alhambra Foundry Co., Ltd.
and

Harold B. Menardi
Consulting Engineer
Western Machinery Co.

Smoke control equipment installed at a gray iron foundry in Alhambra, Calif., has effectively removed particulate matter from cupola emission. Silicone-impregnated glass bags are expected to last 2 years in service. Cupola gases are cooled by recirculated quench air from cooling flues.

Installation of a bag house using silicone-impregnated glass bags at Alhambra Foundry Co., Ltd., Alhambra, Calif., has successfully solved the company's smoke control problem within the strict requirements of the Los Angeles Air Pollution Control District.

Shortly after organization in 1948 the District Authority announced reduction of "smog" would be based on maximum elimination of pollution at the source, consistent with reasonable treatment of each operation.

The more than 60 gray iron foundries of Los Angeles County organized a Gray Iron Foundry Smog Committee. A research program was developed to study cupola emissions and the possibility that these did not contain objectionable amounts of chemicals (other than solid matter) reducing the problem to control of smoke opacity and particulate matter.

Other objectives sought to establish standard procedures for testing cupola emissions and the basis for design and specification of control equipment.

Various types of equipment were tested at selected plants. These included: Inertia or cyclone equipment; spray chamber and/or scrubbers; sonic precipitators; filters (baghouses); electrical precipitators.

As a result of these studies, the Foundry Committee and the District Authority agreed air pollution control problems are limited to control of smoke and reduction in the amount of particulate matter.

The relatively small contribution of the gray iron foundry industry to smog consists of inert mineral ash-principally silica and iron oxide. Cupola emission was found to include only traces of sulfur dioxide and there is no evidence of the presence of any irritants.

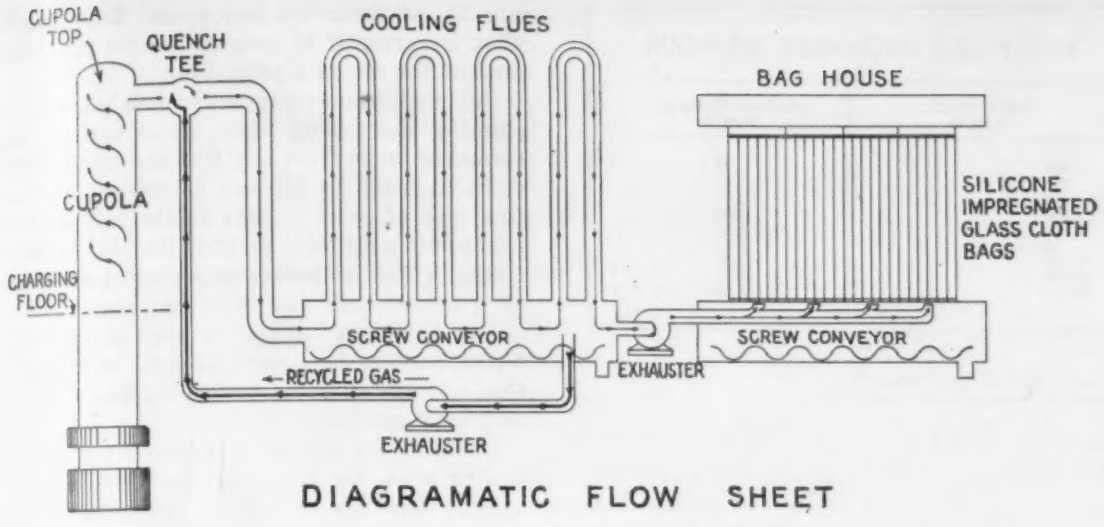
Zinc and lead contents, volatile and condensable oils, tar and gaseous sulfur compounds offer no significant pollution problem. Consequently these have not been taken into consideration except that soluble sulfates are present in the particulate matter in sufficient quantity to be important in the design of remedial equipment where circulating spray water is used.

Total particulate emission was found to vary from 0.8 to 1.6 grains per cu ft of stack emissions at standard conditions (from 13 to 35 lb per ton of iron produced).

Approximately 75 pct of particulate emission was found to be coarser than 325 mesh and could be collected by relatively simple devices. The balance could be effectively and economically removed only by some type of bag filter or by electrical precipitation.

Alhambra Foundry Co., Ltd., decided to design and install a bag house fitted with silicone impregnated glass bags.

Silicone-impregnated glass cloth bags were being used in other industries at temperatures as high as 550°F. Application of silicone increased flexibility of the cloth and a life of 1 to 2 years in gray iron foundry service was indicated. The ability to operate at comparatively high temperatures permitted a considerable decrease in required provision for cooling and eliminated the



FLOWSHEET SHOWS progress of cupola emission through quench T, cooling flues and into bag house.

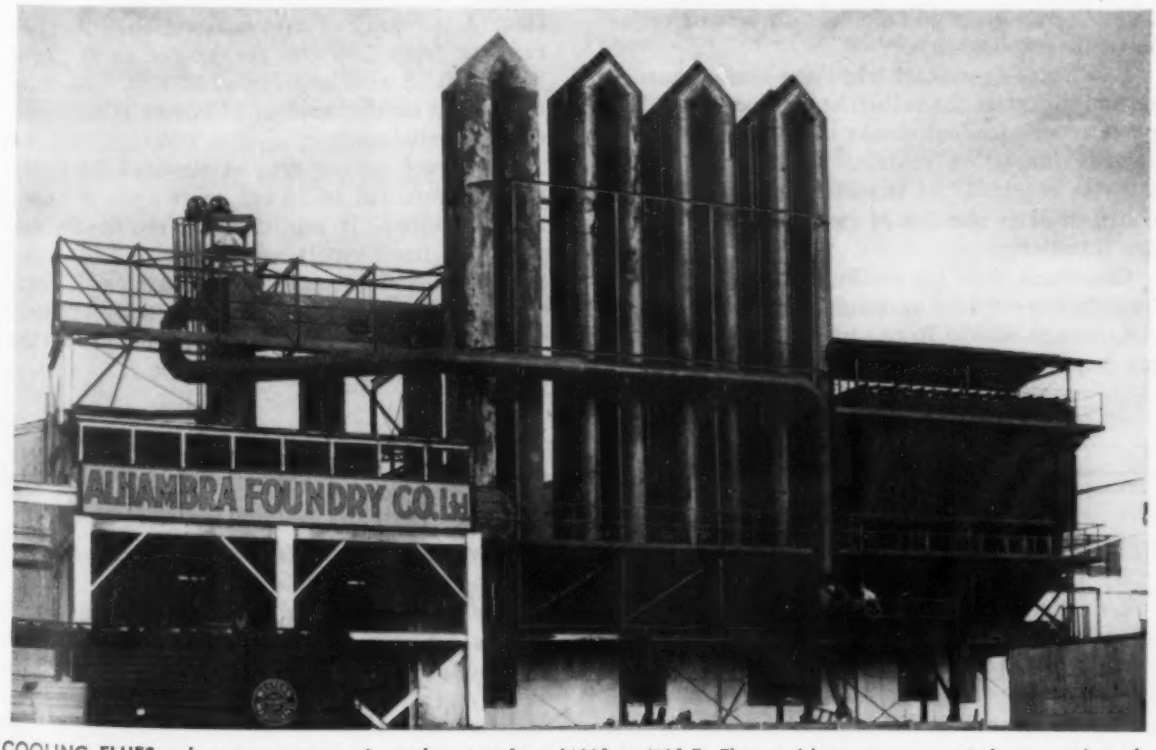
possibility of depositing oil and grease on the bag surface.

Choice of a method for cooling from cupola outlet temperature to bag house temperature lay between atmospheric and evaporative cooling. Atmospheric cooling with higher investment cost but lower maintenance was selected.

The cupola top is closed by a ceramic lined up which may be raised or lowered manually. The cap is counterbalanced to raise automatically in the event of abnormally high pressure in the cupola. A firebrick lined outlet near the cupola top leads to a tee where "quench" air is applied. Cupola effluent temperature is reduced from 2150°F to 1100°F, which temperature is readily handled by mild steel plate. This quench eliminates the need for alloy steels for cooling through the range from 2150° to 1100°F.

From the quench the gases are conducted through a balloon flue to a header which connects with two parallel lines of cooling flue, consisting of 38 in. diam pipe made up in U bends 45 ft high and carried by a common hopper.

Gases are drawn through the system to the pressure chamber of the bag house by an exhaust fan located at the end of the cooling flues. A negative pressure of 2 in. (water gauge) is maintained at the inlet of this fan with a positive pres-



COOLING FLUES reduce temperature of cupola gases from 1100° to 400° F. Flues and hoppers are emptied once each week.

ALLOWABLE DISCHARGE PER HOUR

Process Weight, lb per hr	Maximum Discharge, lb per hr
100	.44
200	.83
500	1.73
1,000	2.80
2,000	4.26
5,000	7.33
10,000	12.00
20,000	24.00
40,000	48.00

Smoke control (continued)

sure of 3 in. to 4 in. in the bag house hopper.

Recirculated quench gas is also drawn through a separate fan from the end of the cooling flues and returned to the quench tee at the cupola outlet. The inlet of this fan is operated at a negative pressure of 3 in. insuring positive circulation in the quench circuit.

The bag house operates under a pressure of 3 in. to 4 in. water gauge and handles up to 4 cu ft of gas (bag house conditions) per sq ft of bag area. The bags 11½ in. in diam by 15 ft long are supported at the top on movable frames. These are shaken by hand for removal of accumulated dust. The bag house hopper is partitioned into four sections so pressure can be shut off from any section for shaking. Alhambra completes a run without the necessity of shaking the bags.

Alhambra Foundry Co., Ltd., produces a diversified line of castings. Average melting rate is about 8 tons per hr and the cupola usually melts for 2 hours each day. The metal charge includes 70 pct pig iron and 30 pct scrap. Greasy automobile scrap gives no trouble with tars or resins in the bag house.

Bag house fans start when the blast is turned on and stop after the bottom has been dropped. The plant superintendent checks the bag house on his regular inspection rounds. No other operating labor is required. At the end of the heat, about one man-hour per day is required for servicing the installation.

Once each week the cooling flue and bag house hoppers are emptied by means of screw conveyors. An average of 550 lb per week is collected from the hoppers, 75 pct from the cooling flue hopper and 25 pct from the bag house. Experimental work is currently in progress on the bag house product for use as a paint filler.

Only maintenance expense to date has been for painting the cooling flues. Metal surface temperatures range from 550°F at the cupola outlet, down to 250°F at the end of the cooling flues. One type of paint is used in the 550° to 375° range with a different paint in the 375° to 250°F range. These temperatures represent conditions on a hot day. So far paint has stood up well.

The Alhambra installation has been operating 6 months. The bags show no signs of deterioration and are expected to give 12 to 18 months additional service.

In developing original calculations for required cooling area, the following conditions were assumed: Quantity of effluent from cupola, 7200 scfm; average temperature of cupola effluent, 1700°F; temperature of quench air, 350°F; temperature of gas at cooling flue inlet, 1100°F; temperature of gases at cooling flue outlet, 400°F.

During a recent test by the Air Pollution Control District during operation, quantity of cupola effluent measured 7980 scfm. Cupola effluent temperature ranged from 1200°F shortly after the blower was turned on to 2150°F immediately after the bottom was dropped. Temperature of quench air ranged from 384°F to 416°F over the entire period of one melt.

Temperature of gas at cooling flue inlet ranged from 930°F to 1122°F over the period of the melt. Temperature of gases at cooling flue outlet ranged from 404°F to 426°F for the period.

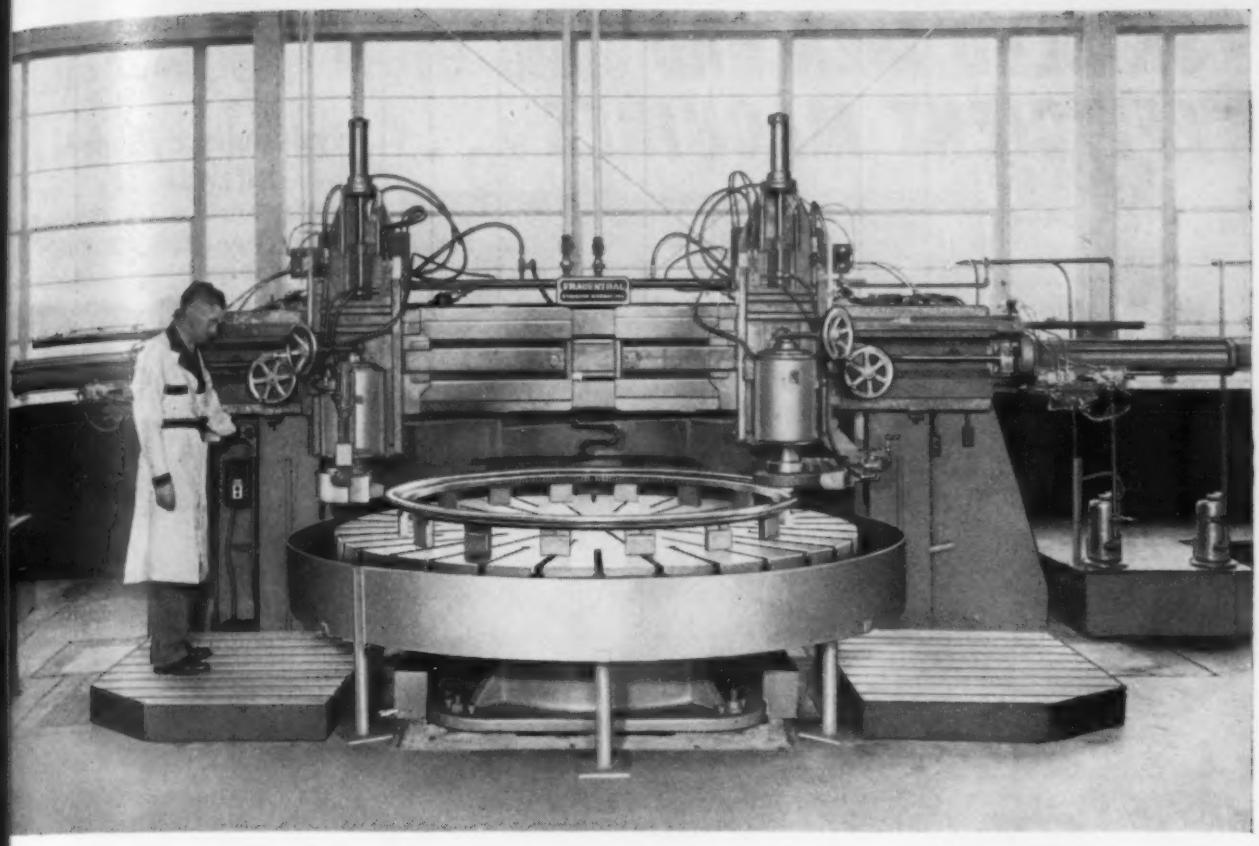
Heat transfer calculations included transfer inside the flues by convection and by inside radiation. Heat transfer outside the cooling pipes included heat transfer by convection and by radiation. A summary of heat transfer showed values ranging from 1.86 btu per hr per sq ft per°F down to 1.18 with an average of 1.52. This gave a required cooling area of 11,920 sq ft under assumed conditions.

The direct cooling area as provided for in the design amounted to 10,442 sq ft against 11,900 sq ft required. It was assumed the cupola cap, the brick lined cupola outlet and the supporting structures and catwalks directly connected with the cooling flues would dissipate sufficient heat through conduction and radiation to make up the difference of approximately 1500 sq ft.

NEW BOOKS

"The Grinding Wheel," by Kenneth B. Lewis. At the behest of the Grinding Wheel Institute, a definitive volume on all phases of grinding practice has been prepared. It is encyclopedic in nature, providing basic information rather than answers for problems which stump the experts. Grinding Wheel Institute, P. O. Box 64, Greendale, Mass. $3.50. 407-p.

"Government Owned Inventions for Free Use," lists 2339 patents available to manufacturers. The patents cover products and processes, new uses for raw materials, and new methods of handling mechanical problems. The patents are on inventions developed in Federal research programs. U. S. Government Printing Office, Washington, D. C. $1.00. 104 p.



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Hydraulic cylinders

Logan 750 Series and rotating hydraulic cylinders are described in a new 22-p. booklet. The units incorporate many advancements in design and construction to provide high operating efficiency. Precision honed bore in seamless steel tubing assures smooth, uniform flow of power and greater protection against leakage past the piston. *Logansport Machine Co., Inc.*

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Butterfly valves

Material specifications, mounting dimensions, pressure ratings and methods for selecting and ordering Honeywell Air-O-Motor diaphragm operators with Continental butterfly valves are presented in a new 12-p. booklet. Two basic body types are available for handling of low velocity fluids and for more severe conditions. *Brown Instruments Div., Minneapolis-Honeywell Regulator Co.*

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Belt conveyers

Standard and special carriers are described in a new 18-p. booklet. Of special interest are the "training rollers" which respond immediately to any shift of the belt off dead center and tilt the carrier into an angular position with respect to the direction of belt travel. This quickly returns the belt to center and the carrier resumes its normal position. *Stephens-Adamson Mfg. Co.*

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Ceramics

One of the most detailed presentations of the background of technical ceramics includes much technical and engineering data of use to designer, engineer and purchasing agent. A golden anniversary publication, the book pictorially describes the many operations required in production of ceramic parts and semifinished materials for industry. *American Lava Corp.*

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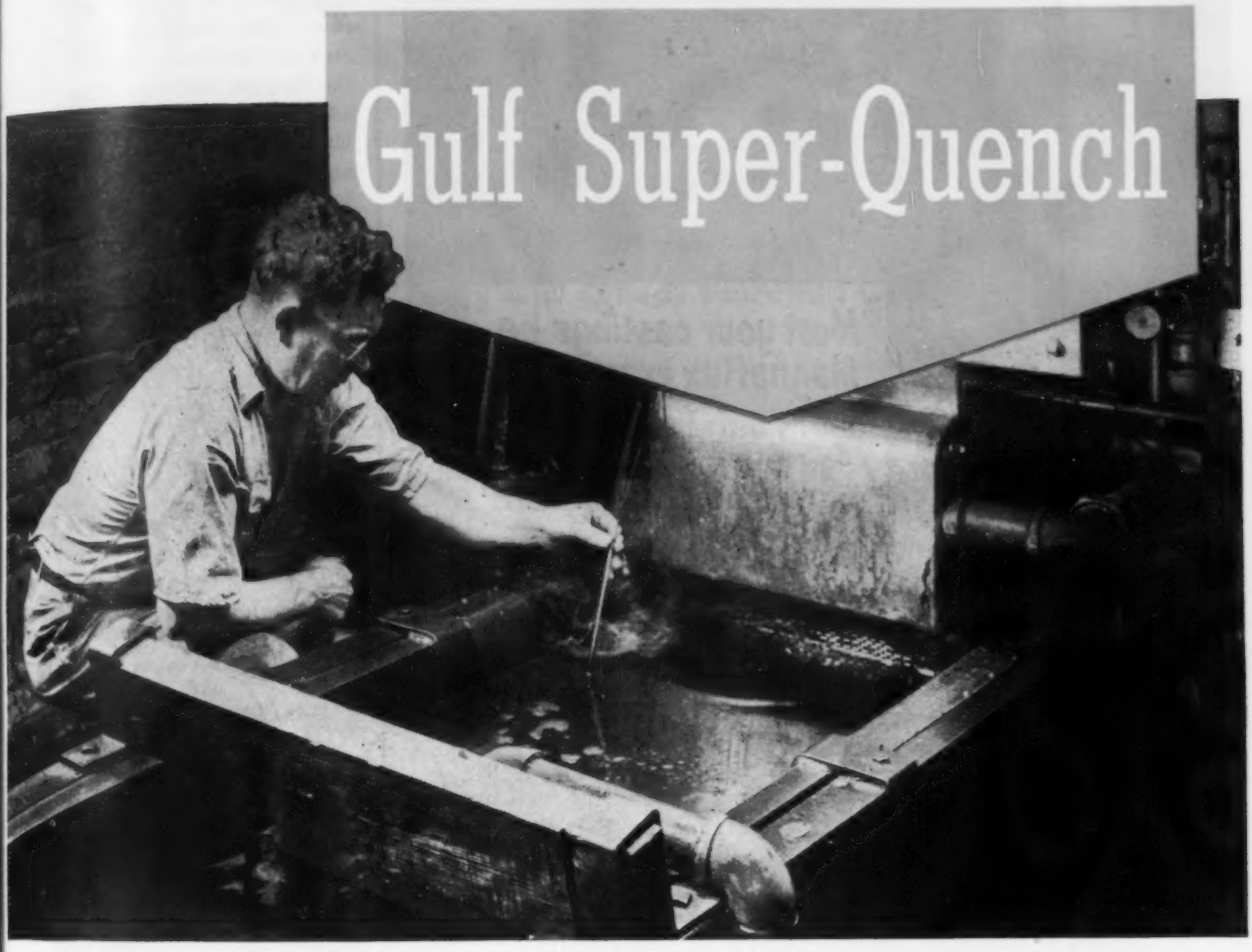
For deeper, more uniform hardness on steels of critical hardenability—



Is the current alloy shortage creating a heat-treating problem for you? Must you accept alloy steels with less chromium, manganese, molybdenum, or vanadium than you originally specified? Then you'll be interested in the performance of Gulf Super-Quench. Because of its dual-quenching power, this outstanding quenching oil helps offset the lower hardenability of today's substitute steels.

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Continued

Instruments

Instrument manufacturing and tooling programs are described and illustrated in a new 8-p. publication *"Daco Doings."* Modern toolmaking facilities, said to include the largest battery of jig boring and jig grinding equipment in the East, are pictured. Development and research laboratory facilities for testing aircraft instruments are also described. *Daco Machine & Tool Co.*

For free copy insert No. 19 on postcard, p. 87.

Belting, packing

Complete tables on carrying capacities, horsepower factors, pulley diameters, maximum and minimum plies for proper troughing and other technical data are included in a new catalog on conveyer and elevator belting. The booklet provides the necessary data to lay out a drive or specify a belt. *New York Belting & Packing Co.*

For free copy insert No. 20 on postcard, p. 87.

Shipping

"How to Ship Heavy Products in Corrugated Shipping Boxes," is the title of the 12th in series of booklets on shipping problems. The 24-p. booklet gives hints on arrangement of parts in the box, sealing, and how to handle containers after packed. *Hinde & Dauch Paper Co.*

For free copy insert No. 21 on postcard, p. 87.

Tube life

Factors affecting tube life in high-pressure and high-temperature applications are described in a new 40-p. booklet. The booklet presents the history and experience behind development of high-temperature tubing and aids those in the field to obtain optimum failure-free service from tubing installations. *Babcock & Wilcox Co.*

For free copy insert No. 22 on postcard, p. 87.

Safety tools

A new 4-p. booklet describes Ampco safety tools. Materials of construction and usage data are included. *Ampco Metal, Inc.*

For free copy insert No. 23 on postcard, p. 87.

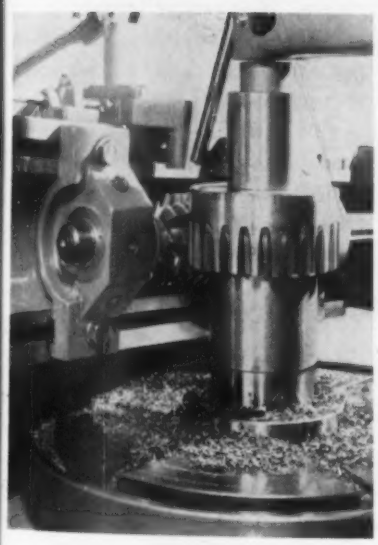
NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 87 or 88.

X-ray unit speeds Fairchild C-119 production

A newly designed X-ray unit is speeding the analysis of 2000 castings used in each Air Force C-119 flying boxcar. With the new equipment producing a film a minute, Fairchild cuts production delay to a minimum without sacrificing thoroughness in inspecting castings for any possible internal defects. The unit combines a semi-automatic radiographic machine with an automatic film developer. Known as GE's OX-140 KV unit, the equipment features a lead-lined X-ray cabinet, with automatic closing doors, which is manually fed trays full of metal castings. All steps in developing, washing, and drying are automatic to coincide with pre-set schedules. *Fairchild Engine & Airplane Corp.*

For more data insert No. 24 on postcard, p. 87.



Universal gear hobber features climb-cutting

With the Cima gear hobbing machine for spur, spiral and worm gears, the hob starts cutting on the bottom of the gear and is fed upward. The chip produced in climb-cutting is thick on top and thin on the bottom. Since there is much less material to be removed at the bottom of the cut, a better finish on the tooth flanks is produced, also permitting an increase of the feed per revolution of the hob, without impairing the finish or accuracy of the teeth. The machine comes equipped with differential mechanism for the simplification of cutting spiral gears. Cutter head is arranged for tangential feeding for generating multiple start worm gears with greater accuracy and full contact without ridges on the tooth flanks. Worm gears may be generated by means of fly cutters, permitting the accurate production of a worm gear for which a hob is not available. Due to the tangential feed head, single or multiple thread worms can also be produced on a production basis. The usual method is reversed by having the cutter on the work arbor and the worm blank on hob arbor. *George Scherr Co., Inc.*

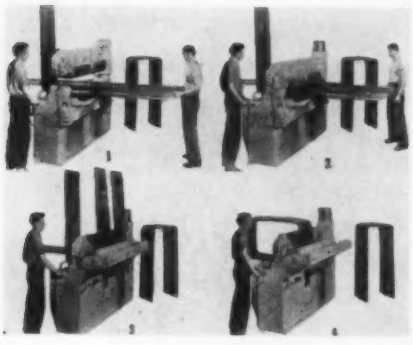
For more data insert No. 25 on postcard, p. 87.

Flexible crane handles bulky, odd-shaped loads

To move equipment or material that does not lend itself to conventional handling methods using a fork or platform truck this electric powered, mobile crane known as Model CZ can be the answer to the problem. It has been redesigned with a wider bed and higher operator control pedals for better forward visibility. Outstanding features include four wheel steer; telescoping boom to provide boom lengths of 12 to 19 ft; silent efficient worm drive; heavy welded steel frame; and three individual motors with solenoid operated brakes for powering slew, hoist and boom. Crane capacity is 10,000 lb at 5½ ft radius. *Elwell-Parker Electric Co.*

For more data insert No. 26 on postcard, p. 87.

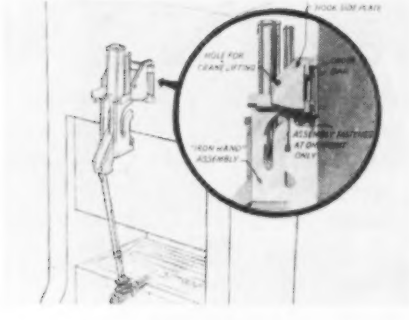
Turn Page



Single-wing tangent bender forms metal cabinets

Rapid, accurate forming of metal cabinets, cases, housings, liners and shrouds having two or four radiused corners is facilitated with a new tangent bender. Continuous high speed production is assured by the open throat design which permits fully formed shapes to be removed from the machine easily and quickly. Ram latches with bed the last inch of travel and exerts up to 17 tons vertical pressure. The bender features automatic positioning of the metal to be formed and close control throughout the entire process. This results in volume production of uniform shapes without work wrinkles or deformation. *Cyril Bath Co.*

For more data insert No. 27 on postcard, p. 87.



Mounting arrangement permits Iron Hand transfer

New mounting arrangement for Sahlin Iron Hand press unloaders permits transfer of the device from one press to another in a matter of minutes. The device allows users to keep unloaders in service while presses are down for repairs or die changeover. Complete Iron Hand assemblies are supplied with specially shaped side plates which hook on to cross bars of a bracket permanently attached to the top of the press. The mounting is fastened and locked at one point only. Holes in the side plates facilitate lifting and transfer of the unloader by crane. *Sahlin Engineering Co.*

For more data insert No. 28 on postcard, p. 87.

Multiple heating units combined in single cabinet

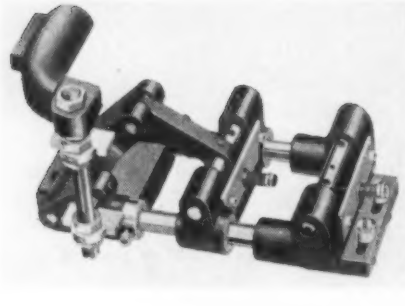
For general purpose induction heating applications, new equipment consists of individual units in a single cabinet each of which can be removed and replaced. Heating stations can be located at any place in the production line. The equipment also fills the need between the existing low power and medium high power machines. It is available in a number of rugged heavy gage steel cabinets, in any combination to meet the user's requirements. Equipment includes circuit breaker type switches, load indicating ammeter, optional, continuously variable output control for zero to full power application, automatic heat-on timer, filament and heat-on indicators, quick disconnect plugs. *Induction Heating Corp.*

For more data insert No. 29 on postcard, p. 87.

Self-dumping trailer provides three-way use

With its ½ cu yd capacity this self-dumping unit was designed for three-way use: pulling by hand, lifting and transporting by fork lift truck, and towing singly or in train by industrial tractor. Conveniently sized for handling by one man, it features a sturdy tongue for manual and tractor handling. Pockets accommodate prongs of a fork lift truck, providing stability while the trailer is being carried by or dumped from a lift truck. Balance of the hopper is such that when the safety catch is released the load is emptied. Hopper automatically returns to loading position. *Phillips Mine & Mill Supply Co.*

For more data insert No. 30 on postcard, p. 87.



Automatic feed for stamping presses

Higher production schedules in the pressroom can be met by proper automatic feeding. Any ordinary press can use the new automatic Surefeed which will increase production, reduce downtime and cut costs. Simplicity of design makes it accurate and dependable. It mounts directly on the die set, no press attachments or alterations are required. Stock up to 2 in. wide and 0.045 in. thick can easily be advanced through movement of the press. *Producto Machine Co.*

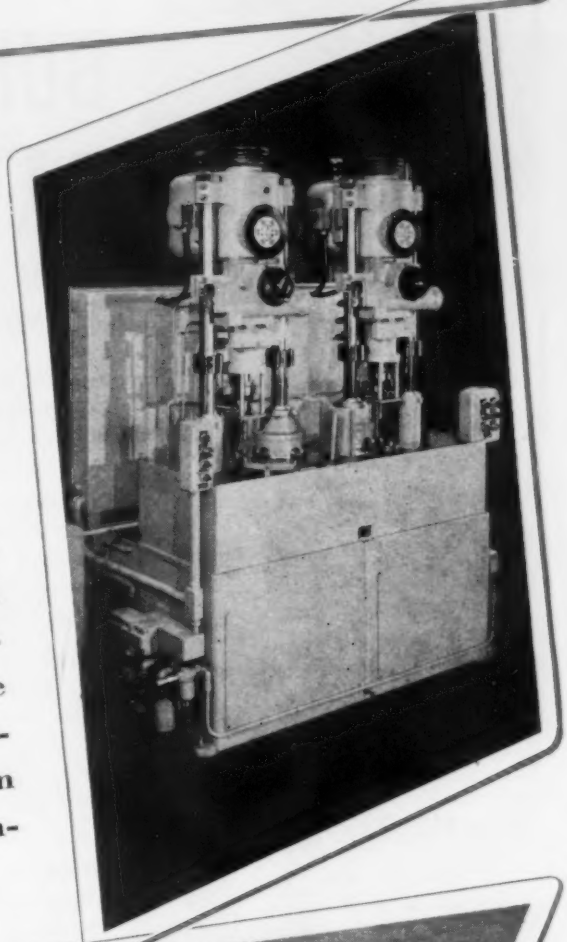
For more data insert No. 31 on postcard, p. 87.

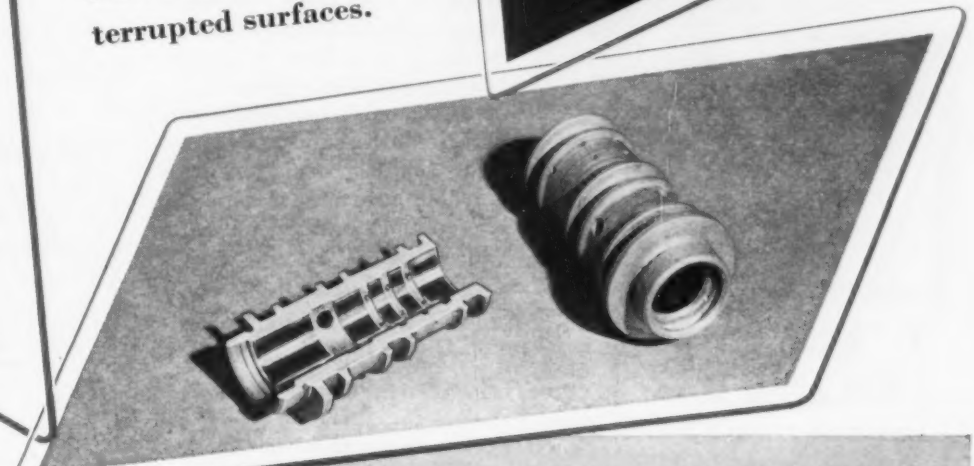
Turn Page

PRECISION
in Hydraguide steering control generated by Microhoning

Hardened steel valve sleeves held to .0002" tolerance for size, geometry and alignment. Edges of control surfaces made sharp and clean.

New guided type MICROMOLD tool and MICROHONER machine makes possible the productive generation of these precision tolerances in hard, interrupted surfaces.





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Packaged rolling mills

Even rolling mills are packaged as units now. It is possible for a product manufacturer to purchase a small, single-stand mill to roll metal to his particular requirements starting with standard available sheet, or strip. The power supply for such a mill comes packaged, too. In a single metal cabinet 6 1/3 ft high, 8 1/3 ft long, x 3 1/3 ft deep is a 75 hp motor-generator set to supply power to the main and reel motors, a small booster m-g set to provide IR-drop compensation for the reel motor and to improve regulation, and all the control apparatus. *Westinghouse Electric Corp.*

For more data insert No. 32 on postcard, p. 87.

Strapping tape

Glass filament reinforced tape has been designed for heavy duty service in strapping, packaging, banding and carton sealing. Of extremely high tensile strength and resistance to handling wear, No. 211 Behr-Cat strapping tape expedites packaging operations, assists in the binding of odd shaped or contoured bundling and is an important alternate for use where metal strapping is subject to curtailment or a weight factor. Powerful adhesion to both porous and smooth surfaces makes it excellent for wrapping together small parts for shipment. *Behr-Manning Corp.*

For more data insert No. 33 on postcard, p. 87.

Zig zag rule

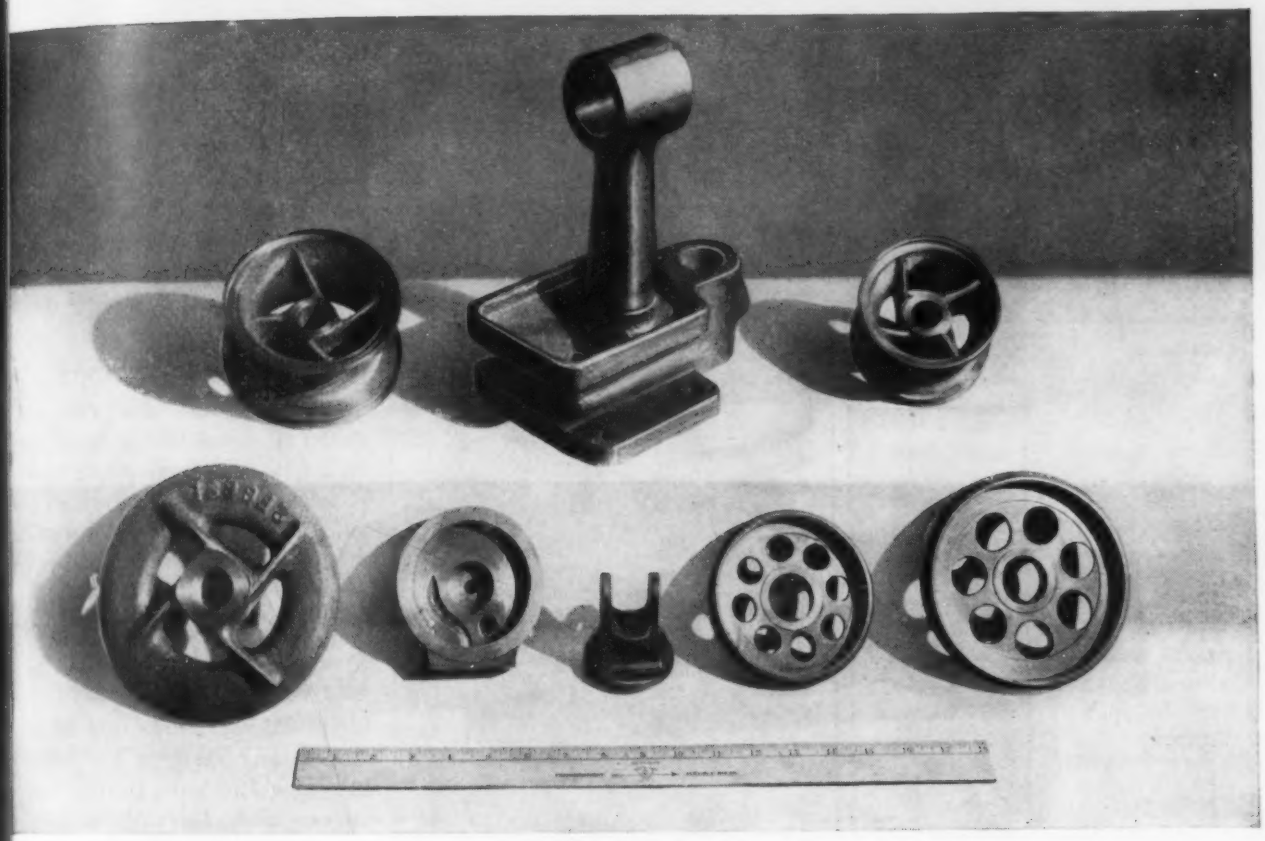
Two-way reading for easier, quicker measuring features the new Read-Rite rule. It reads left to right, or right to left, by rolling the rule over in a natural manner, eliminating end-over-end twisting or flopping of the rule. When the rule is opened graduations always lie close to the work for easy reading. The rule has longer wearing nickel silver joints with ball-socket action; plastic finish for protection; and large easy-to-read numbers. *Stanley Tools.*

For more data insert No. 34 on postcard, p. 87.

Turn Page

NISILOY* to eliminate hard chilled areas in gray iron castings

. . . REDUCE machining time, tool wear, rejections



Produce *machinable* gray iron castings regardless of sharp variations in section thickness . . .

Eliminate localized hard areas or chilled (white) edges and surfaces . . .

Reduce machining time, tool wear and rejections . . . *raise both quality and quantity of your output by controlling gray iron structure with small ladle additions of NISILOY.*

Designed specifically to promote better machinability, NISILOY is a powerful innoculant and graphitizer containing about 60% Nickel, 30% silicon, balance essentially iron.

Mail the coupon now . . . for your *free* copy of a booklet that describes how Nisiloy helps you improve structure and machinability of gray iron castings.

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Company.....

Address.....

City.....*State*.....

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New Equipment

Continued

Checking with light

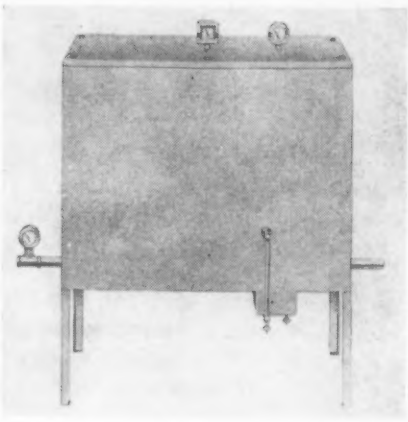
The new Monolight represents the latest development toward a larger, more intense light source from which to check the precision accuracy of gaging instruments and parts in production. It is a self-contained unit in a cast-aluminum body, having a high-intensity helium tube light source providing 53 ft candle power on the testing stage. Standard stage is a 6⅛x4⅛ in. phenolic plate. Power supply is a 7500-v transformer operating on 110-120 v 60 cycle ac. *DoAll Co.*

For more data insert No. 35 on postcard, p. 87.

Tube bender

Both ½ and ⅝-in. OD copper, aluminum, brass and other soft, thin-wall metal tubing can be bent on a new combination tube bender. It has two piece construction and quickly comes apart to slip over the tube at the point where the bend is needed. *Imperial Brass Mfg.Co.*

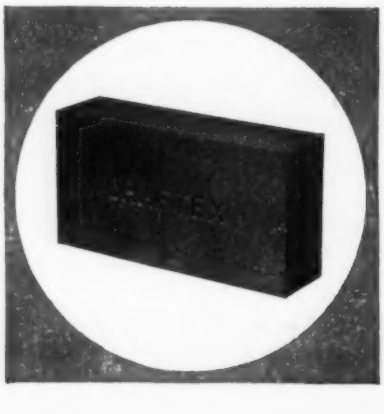
For more data insert No. 36 on postcard, p. 87.



Water-oil separator

Simplicity of design and efficient, economical operation are featured in a new Houdaille PurDry water-oil separator, for turbine, hydraulic oils or any industrial oil purification problem where water is a troublesome factor. Continuous and automatic operation of the unit on bypass circulation keeps the oil in safe operating condition at all times. *Honan-Crane Corp.*

For more data insert No. 37 on postcard, p. 87.



Clay-graphite brick

Graftex, a clay-graphite refractory brick increases the life of installations having slag erosion problems. It is a prefired product and has the outstanding ability of shedding slag, preventing rapid deterioration of the refractory. Brick is available in 9-in. straights and most 9-in. standard series brick. *North American Refractories Co.*

For more data insert No. 38 on postcard, p. 87.

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New Equipment

Continued

Die steel

New high strength die steel for elevated temperatures can be cold hobbed. It is said to approach the hobbing ease of regular hobbing irons yet compares favorably with the high strength of the 5 pct chrome hot work die steels. Known as Super Samson, the steel was developed primarily for applications involving die casting of aluminum and zinc. It is also being used in plastic mold work involving large cavities or elevated temperatures. It is said to harden uniformly in dies with wall thicknesses up to 4 in. *Carpenter Steel Co.*

For more data insert No. 39 on postcard, p. 87.

Surface conditioner

An alkali surface conditioner for removing oxidized oils from aluminum core driers, aluminum and magnesium as well as steel core plates, forge dies, aluminum forgings, etc., is a compound made up of a fixed percentage of free alkalies combined with buffers, inhibitors, and surface active agents. It is said to be an efficient and safe surface conditioner for the metals involved. *Nielco Laboratories.*

For more data insert No. 40 on postcard, p. 87.

Welding positioner

Automatically engaging, raising and rotating a 70-ton hopper car to permit finish welding with the submerged arc welding process can be accomplished with a new welding positioner. Cars are tacked together before being rolled to the positioner on their own truck. After the car is properly located, it is clamped automatically by air cylinders which operate the outriggers on the positioner. Raising and rotating are accomplished by pushbuttons which synchronize the movements. The entire operation is done in less than 3 min. The positioner requires only a two-man crew. Approximately 300 ft of welding is done in 17 min by 10 manual welders and 12 semi-automatic submerged-arc welders. *Pandjiris Weldment Co.*

For more data insert No. 41 on postcard, p. 87.

Turn Page

No-torch cold solder

Cold solder filler material for blowholes, fractures in castings, patterns is applied with a putty knife. Using powdered aluminum in a quick drying non-soluble liquid vehicle, the vehicle evaporates leaving the deposited aluminum in a smooth surface that will not crack, chip, peel or shrink in its recommended service. Cold solder when thinned down with a solvent supplied by the manufacturer can be brushed or sprayed. *A. L. Okun.*

For more data insert No. 42 on postcard, p. 87.

Spring pin

A heat treated tubular slotted dowel pin manufactured in standard and light duty types has chamfered ends permitting easy rapid insertion. The pin becomes compressed as it is driven or pressed in place. When placed in the hole it remains tight and secure against vibration, but can be removed with a drift punch if required. Due to the spring quality, this Sel-Lok spring pin can be reused, since its ability to resume the original diameter is inherent. *Self Lock Fastener Corp.*

For more data insert No. 43 on postcard, p. 87.

Quick parts location

Jig boring or milling without jigs or fixtures is permitted with the Speedi-Spacer, a new, multi-position locating device. Any good upright drill or radial drill with an accurate spindle becomes a jig boring tool. In most instances, the device can be set up in a fraction of the time required on a jig borer or boring mill. Positive positioning is provided by nine longitudinal and nine transverse position stop screws. Hardened measuring pads upon which these screws bear are an integral part of the unit. Longitudinal and transverse movements are determined by various settings of the screws; table position is maintained by positive locks. *Queen City Machine Tool Co.*

For more data insert No. 44 on postcard, p. 87.

Gap Between Supply and Demand Growing Narrower

High production and use restrictions credited . . . Some controls may be relaxed . . . Move would be sign of good faith . . . Warehouse volume high . . . Ingot rate scores 2-point gain.

Surging steel production and restrictions on use are narrowing the gap between supply and demand. No longer are all products almost uniformly tight. Recently there has been a marked easing in several items, a few of which are now in easy supply.

The joker is that no one can be sure how much of this easing is due to government restrictions on use. How much wider would the gap be if these restrictions were lifted?

Purchasing agents are admittedly buying more cautiously. But their consensus seems to be that overall supply is not yet close to demand. That goal is still at least several months beyond attainment, possibly longer.

Good Faith—But chances are the government wil soon be able to make a show of good faith on its promise to relax controls, product by product, as soon as feasible. A move in that direction has already been started on straight chrome stainless and carbon tool steels. Decision is expected to be reached this week on whether to lift controls on these products completely, or just relax them. In either event restrictions will be eased, though it may be 3 weeks or so before action is announced.

This decision will be based on market factors which have been evident for some time. Stainless producers have been actively seeking straight chrome orders. They need them to keep their furnaces going. The exception is one producer who booked far ahead several months ago. He's still booked into April.

Best Bet—Mills are advising consumers to switch from nickel grades to chrome stainless wherever possible. Some have done so with satisfactory results; others are still considering the change. Although straight chrome is more difficult to work, it is a better bet for future supply. Outlook for nickel is dim for all except very high priority uses. Mill allotments have been getting smaller.

Carbon tool steel is in good supply at warehouse level. Behind this is a mill pool, now pretty well filled. That's why industry has been advising controls officials to allow more freedom in this market.

No Relief—On the other side of the ledger are a group of heavyweight products which show no signs of easing. Plate demand is getting even more voracious. Even larger quantities of this product will have to be turned out on strip mills. Such shifts have already trimmed profit margins, and, in some instances, idled other finishing facilities.

All bars, excepting tool steel bars, are in tight supply. In structurals the gap between stated needs and supply has been narrowed. But it is still wide enough to keep strong pressure on the mills for at least the next several months.

Alloy Paradox—The alloy picture is confused. Orders for military use, while large, have fallen far short of expectations. Yet other users have been cut back. Result: Open space on mill books. Engineering changes and tardy tool deliveries have slowed the full impact of military orders. Considerable tonnage delivered for military use is piling up in inventory.

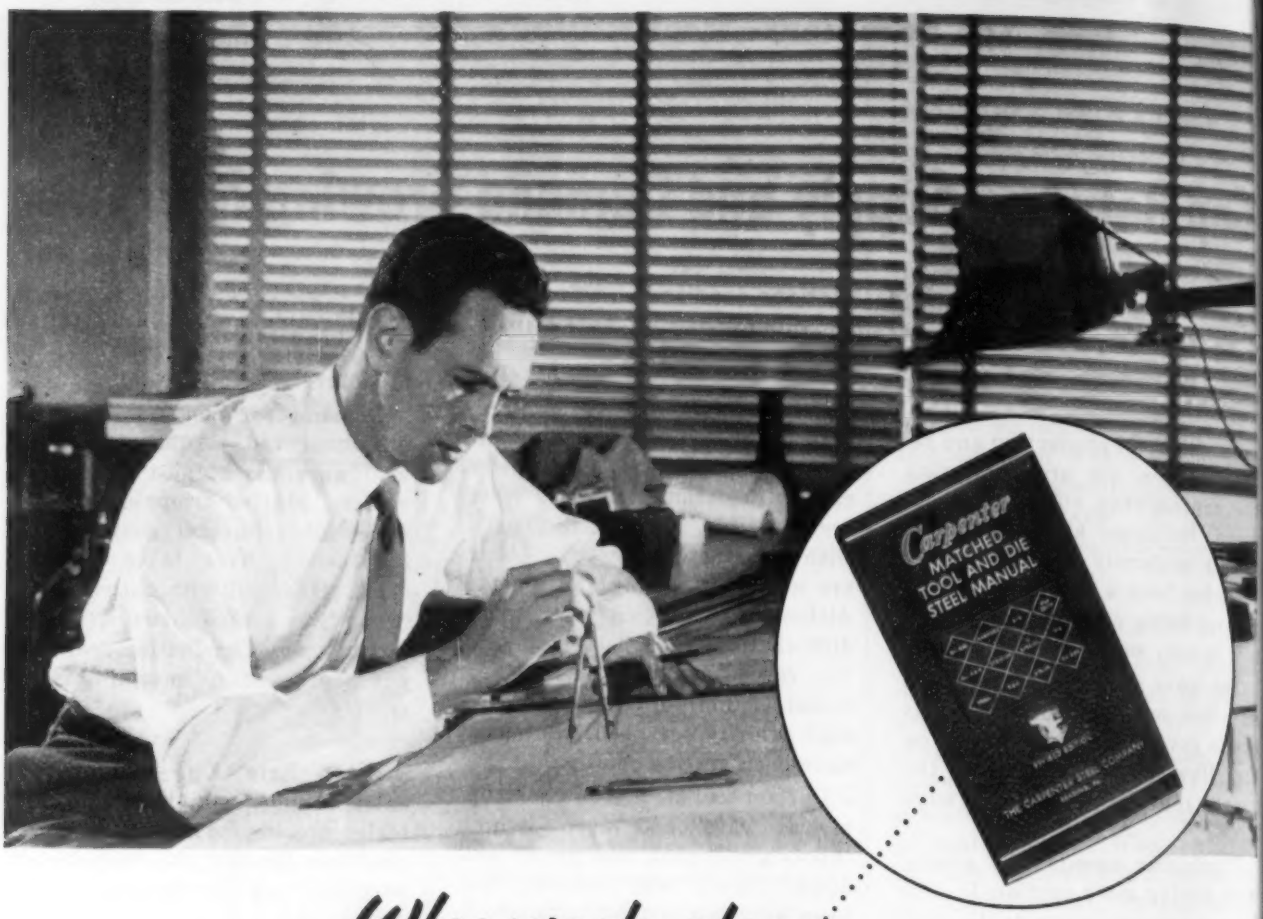
Demand for conversion ingots has improved. Auto companies, who were the biggest sheet converters, started dropping out of the picture several months ago. But others have taken up the slack. One mill with excess ingot capacity is booked through the end of the year. The British deal will put more pressure on semi-finished steel.

Ingot Rate Up — Warehouse sales volume is high; and inventories are improving. Spot shortages are bothersome, but overall supplies are improving. Cold-rolled sheet and strip, carbon tool steel and chrome stainless are easier. Structural shapes, bars of all types, galvanized products and nickel stainless are in very tight supply. Shipments to warehouses last year were greater than ever before. But their percentage of total steel shipments (17.8 pct) was slightly lower than the previous year.

Steelmaking operations this week are scheduled at 99.5 pct of rated capacity, up two points from last week's revised rate. These ingot rates are based on new official steel capacity of 108,587,670 net tons per year.

Two Threats — Continued high production is threatened by both the scrap shortage and the spectre of a steel strike. Timely shipments of scrap arrived in time to forestall closing of 10 more openhearths in Pittsburgh. Mills are eagerly charging material that ordinarily would be quickly rejected. Steel wage hearings are in 3-week recess while the industry prepares its answer to labor's case.

WHEREVER TOOL STEELS ARE APPLIED...



Why work alone

to get more output from present facilities?

Why work alone . . . when you can use the experience of *hundreds* of men to help raise tooling standards and get maximum productivity from manpower and equipment?

Here's a personalized program developed *expressly for* the plant that makes or uses tools and dies. It is the net thinking and imagination of many specialists to help you add speed and sureness to the hands of toolmakers and heat treaters. It brings you ideas and methods to shorten tooling-up cycles, break production bottlenecks and train apprentices faster. It's brought right to your plant door by your Carpenter representative.

Consider the many things that make it work: Time-saving data from constant Carpenter laboratory research, issued in regular Service Bulletins. More than 60 years of experience in applying tool steels, made available in Carpenter's Matched Tool and Die Steel Manual. Timely tips on getting more from present heat treating equipment, yours in a new slide chart. Modern, *visual* slide films to refresh skilled men and train apprentices.

Why work *alone* to boost output, when this personalized program is available at no extra cost? Start now to get the help it brings you. THE CARPENTER STEEL COMPANY, 121 W. Bern St., Reading, Pa.

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DON'T WAIT... COOPERATE!
The U.S. Needs Your Steel Scrap, Now

Market Briefs

new steel capacity — Annual steel capacity of the U. S. on Jan. 1, 1952 has been placed at 108,587,670 tons by the American Iron & Steel Institute. This is an increase of over 4.3 million tons from last year's total. Blast furnace capacity took a jump of 1.3 million tons to a new rate of 73,782,340 tons. Coke oven capacity rose almost 800,000 tons to 67,060,240 tons yearly. Steel operating rates will be calculated on the new figure. Rates for the first 3 weeks of this year are revised to 97.5 pct, 98.0 pct and 97.5 pct, respectively, approximately 4 pct lower in each case.

scrap improves — Scrap iron and steel allocations from National Production Authority to U. S. Steel Corp. have helped restore to production three of five openhearth furnaces shut down in the Pittsburgh district for lack of scrap. Three furnaces remained idle in the Chicago area. However, supplies in Pittsburgh were still less than 3 days.

new capacity — Capacity of Monongahela Valley plants of U. S. Steel Corp. declined by more than 220,000 ingot tons during 1951. Biggest drop was at Homestead Works, where capacity was off 500,000 tons. Duquesne was up 117,000 tons, Vandergrift 70,000 and McKeesport plant of National Tube, 60,000. Clairton was up 30,000. Youngstown Works was up 200,000 tons.

there's hope — Canada, still struggling with a worsening steel shortage, hopes that increasing steelmaking capacity in the United States will permit greater supplies to filter across the border in the third or fourth quarter. The steel shortage in Canada is running the same pattern as in the U. S. Civilian producers will feel a tighter pinch in the first quarter as more steel is channeled to defense.

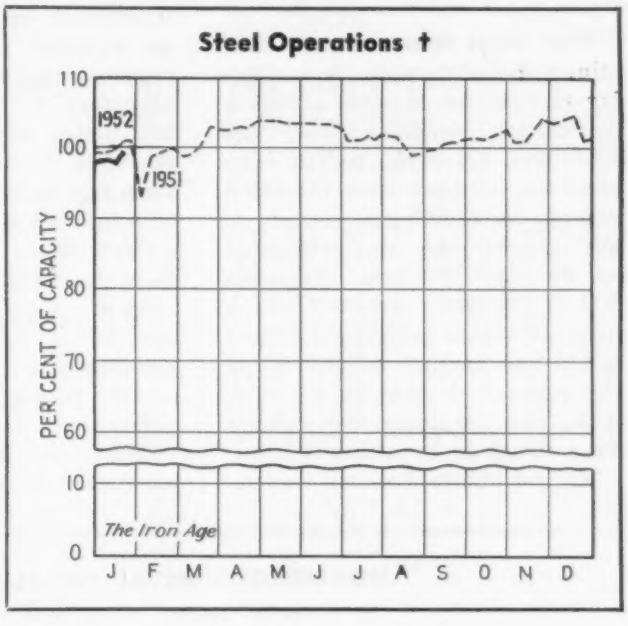
plant reopened — Heppenstall Co., Pittsburgh, expects to be in production within a few months at a steel forging plant at Eddystone, Pa., held in standby condition since 1944. The reopened plant will produce alloy steel die blocks to a maximum size of 16 tons each. The blocks will go to drop forgers furnishing forged structural and engine parts to the aircraft industry. U. S. Air Force has leased the plant to Heppenstall, which operated it during World War II.

ingots to England — Pittsburgh Steel Co. has been shipping ingots and other steel products to England since last November. The shipments are part of a deal whereby the U. S. swaps ingots for aluminum and tin.

piping solids — Use of pipelines for transportation of solids is gaining. One sign is International Nickel of Canada's completion of a 7½-mile pipeline to move nickel-copper concentrate to the Copper Cliff reduction plant. Waste material is also carried to a dumping area. Some 1800 tons of concentrate and 82,000 tons of waste are produced daily at the concentrating plant. These are mixed with water and pumped at rates of 800 and 2500 gpm respectively.

no longer secret — Subcontractors should benefit from a new government plan whereby the military services will publish full award information on unclassified contracts in excess of $25,000. Specific data will appear in the *Synopses of Contract Award Information* published by Commerce Dept. Decision to make public this information modifies previous Defense Dept. actions, including a ban on publishing quantities and dollar amounts of contracts valued at more than $250,000.

still not plentiful — Structural steel inquiries have dropped to 30 or 40 pct of the volume a year ago. With a rated allotment a steel user can get delivery in about 8 or 9 months as compared to twice as long last spring.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Jan. 13	96.0	102.5	102.0	101.0	95.0	104.0	103.0	104.0	102.0	104.0	98.0	76.0	94.0	97.5*
Jan. 20	99.0	103.5	102.0	100.0	99.0	104.0	101.5	106.0	102.0	104.0	93.0	85.1	103.5	99.5

† Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

Set Aluminum Strike Deadlines

About 75 pct of Alcoa's labor to quit in February unless agreement is reached . . . Government may be forced to release stockpile nickel . . . Metal deal confirmed—*By R. L. Hatschek.*

Aluminum production is being threatened by possible strikes of Aluminum Co. of America workers. United Steelworkers of America, CIO, has set Feb. 1 as its strike date and Aluminum Workers Union, AFL, says it will quit on Feb. 3 if a new agreement has not been reached. The 18,000 USW workers and 9500 AWU workers involved represent about three fourths of Alcoa's labor force.

The two unions are making pretty much the same demands including a wage boost of 18 to 18½¢ per hour, shift premiums, vacation pay changes and similar points all of which add up to an estimated cost to the company of over 50¢ per man per hour. These demands are essentially the same as faced by the steel industry.

Wait WSB Entry—Kaiser Aluminum & Chemical Co. is in similar circumstances with a Feb. 1 negotiation deadline from the USW but, since the parent company also produces steel, the union expects its aluminum workers to get roughly the same settlement as its steel workers. Reynolds Metals Co. has a contract which does not expire until April 15 and is not anticipating difficulties for the present though its Phoenix, Ariz., and Troutdale, Ore., plants were struck in December.

At first glance it seems surprising that the aluminum deadlines were set ahead of the steel industry deadline. It is extremely doubtful that aluminum labor even wants a settlement before steel. This strike threat would appear to be a lever to get the Wage Stabilization Board into the picture—which will probably happen.

Prices Up, Too?—M. M. Anderson, vice-president in charge of industrial relations for Alcoa, states that any general wage increase and other money demands would necessitate a boost in the prices of aluminum and aluminum products. Office of Price Stabilization hasn't said so but you can bet that it doesn't approve of this.

May Take Stockpile Nickel—High alloy steel requirements for the military, particularly the jet engine program, may make it necessary for the government to use nickel now in the strategic stockpile. To keep the jet program from falling 3 to 6 months behind schedule, an additional 330,000 to 500,000 lb of nickel is required monthly, acording to Washington sources. Conservation programs are at a practical limit and whether or not the Cuban Nicaro nickel production, scheduled to start soon, will result in a net increase to the U. S. is problematical. If this production is placed under International Materials Conference allocations, imports from other sources will be reduced.

See Continued Shortages—Specialists of the Senate Small Business Committee have found that new aluminum plants now planned or under construction "can make little contribution to the total supply picture until early 1953," This outlook caused the senators to predict that small fabricators cannot hope to approximate normal production for at least the next 3 years.

Bleak days are ahead for copper consumers, too, the senators report. Even with the expectation of a "modest increase" in domestic production and larger supplies from abroad, military and civilian demand this year will lead to a "continued severe shortage of copper." Defense Materials Procurement Agency deputy administrator Howard I. Young also described the copper shortage as "extremely serious" and called for a production boost.

Confirm U.S.-U.K. Swap—The steel for tin and aluminum deal reported last week has been confirmed and more specific details have been announced. The U. S. is to receive 27,550 net tons of Canadian aluminum, the major portion of which is to be delivered in the last three quarters of the year. The metal, representing about 10 pct of England's annual supply, is to be replaced by mid-1953.

The tin contract is for 20,000 long tons at $1.18 f.o.b. Singapore, the equivalent of about $1.21½ per lb c.i.f. New York.

Reconstruction Finance Corp. raised its price on Tuesday to completely cover the increased costs. This was expected since RFC, in its negotiations with Bolivia, had expressed an unwillingness to lose money in tin dealing. Consumers are more interested in getting tin than in the price.

NONFERROUS METAL PRICES

	Jan. 16	Jan. 17	Jan. 18	Jan. 19	Jan. 21	Jan. 22
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	23.625	22.625
Tin, Straits, New York	$1.03	$1.03	$1.03	....	$1.03	$1.215
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

Note: Quotations are going prices.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 36, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in, $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ¼ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 10,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb.; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$206 to $210
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	32.25
No. 315	30.25
88-10-2 ingot	
No. 210	40.00
No. 215	38.50
No. 245	33.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19½	17⅞
Red brass	20½	19¾
Comm. bronze	20½	19¾
Mang. bronze	18½	17⅞
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Maker's Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	16.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17¾
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14¾
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15¾—16
Battery plates (dry)	10 —10½
Batteries, acid free	7 — 7¼

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	48 —50
Mixed common babbitt	16¼—16½
Solder joints	21 —22
Siphon tops	48 —50
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	16 —16½
Hand picked type shells	10 —11
Lino. and stero. dross	8¾— 9
Electro. dross	7½— 8

Bearing the Blast Furnace Burden

New blast furnace capacity only 13 pct in place while openhearths lead with 31 pct . . . Life could be easier for scrap man if race were even . . . Keystone openhearth stays quiet.

Besides bearing the strain of harvesting enough scrap iron and steel to supply record-producing present capacity, the scrap man will be nagged increasingly to ship something extra for new openhearths coming in.

This task will be somewhat complicated because new openhearth installations have been completed at a sprint while accompanying new blast furnace capacity has been running a poor second. This means less pig iron to fill the ratio of scrap to pig and in some cases bear the brunt when scrap supply is temporarily dislocated.

Defense Production Administration reports that while 31 pct of steel plants and rolling mills are now in place under the defense expansion program, only 13 pct of planned blast furnace capacity has been installed. DPA officials are turning on a bright green light for blast furnace construction but the gap is a wide one.

If it were not for this disparity in construction schedules—caused by shortages of heavy materials—the scrap man's burden would be a lighter one and his back would not be so sore from so many people prodding him at the same time.

Keystone Steel & Wire Co., Peoria, Ill., could not put its new openhearth into production because it feared the scrap supply would not stand the overload.

The scrap industry, aided by a favorable change in the weather and the passing of the slow, holiday-riddled month of December, is now pitching into the job of collecting all the scrap that's available. Scrap is stirring.

Auto wreckers are gaining much attention from NPA as a prime source of extra scrap. Meetings between auto wreckers and NPA men will be held all over the country to discuss merits and demerits of M-92, inventory turnover order.

At Cleveland, graveyard operators, NPA men, and scrap dealers met at Hotel Holleden to discuss M-92.

Pittsburgh—Because of scrap allocations help from NPA, U.S. Steel was able to restore to production on Wednesday of this week three of five openhearths it had shut down here for lack of scrap. Three furnaces remained idle at Gary, Ind. Supplies in Pittsburgh were still under 3 days for U.S. Steel. Scrap from 208 slot machines seized by the FBI went to mills here. About 5 or 6 tons was salvaged. In Vandergrift, Pa., citizens cut down their 90-ft flagpole for scrap, climaxing a 4-day drive.

Chicago—Scrap inventories seem to be taking a turn for the worse. One fair-sized mill is reported to be in serious difficulty with inventories hovering around the 4-day mark. Allocations have been made to help out. Another small producer is also reported in greater trouble. U. S. Steel still has three openhearths down. Other mill inventories range from 3 weeks to a month. A down-state producer was unable to start a new openhearth because of scrap.

Philadelphia—The scrap market in this district shows little change this week. There is still not enough openhearth material to go around, cast grades remain soft, and electric furnace grades show a slight easing, brokers report. Better weather has been an aid to scrap.

New York—Movement of scrap is picking up. Doldrums are about over, the trade feels as it crosses its fingers against any sudden bad weather. Dealers and brokers say not a stone is left unturned in the search for scrap. Allocations are heavy for Pittsburgh and one source was optimistic that Pittsburgh would squeak through.

Detroit—Collections of scrap from miscellaneous sources have improved here during the past week, largely as the weather has improved. These small gains are more than offset by dwindling shipments of industrial scrap. A check with local dealers fails to show any appreciable change in the amount of alloy being returned to the mills through scrap. The comparatively low production of most items for defense is undoubtedly responsible. Dealer allocations are increasing.

Cleveland—Scattered reports of increased activities in scrap flow are offset by claims of worsening conditions. Mills for the most part are still operating hand to mouth with little relief in sight. Nowhere are receipts constant enough to build up inventories. In Youngstown area, mills' condition is reported grave but as yet no furnaces are down. Cast grades, particularly cupola, remain free. Industrial and other premium grades show no sign of improvement.

St. Louis—Warmer weather brought a sharp improvement in the scrap flow. Receipts were larger than for any period in the last 6 weeks. Some collections were slowed up because of slush that made many roads impassable. Cast continues dull.

Birmingham—Some heavy melting scrap is coming into the district as a result of scrap drives. Brokers say allocations to mills only when they are down to 4 days supply will cause some shutdowns. Brokers and dealers say they will continue to take care of their customers' allocations but say others may find it difficult to get scrap within 4 days after the allotment.

Cincinnati — Allocated shipments from southern states continue to keep mills in this area in operation. Industrial grades from local plants and from the Dayton area also continue to arrive in less than normal supply. Cast here is plentiful with many unstripped motor blocks being offered at below ceiling prices. General scrap outlook is not optimistic.

Buffalo—One of the two top mills here is holding its own on scrap. The other dips into the stockpile. Both are getting allocations. Some scrap pickup has been reported. Current allocations from this district have just about been completed and dealers hope they will be able to ship more locally.

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, a set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.53	.65	.75	.51	.75	.51	.75	.70	.75	.83	.65	.26	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.95	.50	.50	.78	.50	.43	.51	.33	.57	.66	.62	.88	.88
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES	OPS No.																																							
No. 1 bundles	1	$44.00						$44.00						$43.00				$42.50						$42.00				$41.00	$41.15	$40.00	$39.50	$39.00			$38.00	$37.00				$35.00
No. 1 busheling	2	44.00						44.00						43.00				42.50						42.00				41.00	41.15	40.00	39.50	39.00			38.00	37.00				35.00
No. 1 heavy melting	3	43.00						43.00						42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00				34.00
No. 2 heavy melting	4	43.00						43.00						42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00				34.00
No. 2 bundles	5	43.00						43.00						42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00				34.00
Machine shop turnings	6	34.00						34.00						33.00				32.50						32.00				31.00	31.15	30.00	29.50	29.00			28.00	27.00				28.00
Mixed borings and turnings	7	38.00						38.00						37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00			32.00	31.00				29.00
Shoveling turnings	8	38.00						38.00						37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00			32.00	31.00				29.00
Cast iron borings	10	38.00						38.00						37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00			32.00	31.00				29.00
No. 1 chemical borings	26	41.00						41.00						40.00				39.50						39.00				38.00	38.15	37.00	36.50	36.00			35.00	34.00				32.00
Forge crops	11	51.50						51.50						50.50				50.00						49.50				48.50	48.65	47.50	47.00	46.50			45.50	44.50				42.50
Bar crops and plate	12	49.00						49.00						48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00			43.00	42.00				40.00
Punchings and plate	14	46.50						46.50						45.50				45.00						44.50				43.50	43.65	42.50	42.00	41.50			40.50	39.50				37.50
Electric furnace bundles	15	46.00						46.00						45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00			40.00	39.00				37.00
Cut struct., plate, 3 ft and less	16	47.00						47.00						46.00				45.50						45.00				44.00	44.15	43.00	42.50	42.00			41.00	40.00				38.00
Cut struct., plate, 2 ft and less	17	49.00						49.00						48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00			43.00	42.00				40.00
Cut struct., plate, 1 ft and less	18	50.00						50.00						49.00				48.50						48.00				47.00	47.15	46.00	45.50	45.00			44.00	43.00				41.00
Foundry steel, 2 ft and less	20	44.00						44.00						43.00				42.50						42.00				41.00	41.15	40.00	39.50	39.00			38.00	37.00				35.00
Foundry steel, 1 ft and less	21	46.00						46.00						45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00			40.00	39.00				37.00
Heavy trimmings	24	43.00						43.00						42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00				34.00
Hard steel, 2 ft and less	30	47.00						49.00						48.00				47.50						47.00				45.00	46.15	45.00	44.50	44.00			43.00	42.00				40.00
No. 1 RR heavy melting	RR 1	46.00						46.00						45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00			40.00	39.00				37.00
Scrap rails, random lengths	RR 14	48.00						48.00						47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00			42.00	41.00				39.00
Scrap rails, 3 ft and less	RR 16	51.00						51.00						50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00				42.00
Scrap rails, 2 ft and less	RR 17	52.00						52.00						51.00				50.50						50.00				49.00	49.15	48.00	47.50	47.00			46.00	45.00				43.00
Scrap rails, 18 in. and less	RR 18	54.00						54.00						53.00				52.50						52.00				51.00	51.15	50.00	49.50	49.00			48.00	47.00				46.00
Rerolling rails	RR 15	53.00						53.00						52.00				51.50						51.00				50.00	50.15	49.00	48.50	48.00			47.00	46.00				44.00
Uncut tires	RR 20	48.00						48.00						47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00			42.00	41.00				39.00
Cut tires	RR 21	51.00						51.00						50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00				42.00
Cut bolsters and side frames	RR 23	49.00						49.00						48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00			43.00	42.00				40.00
RR specialties	RR 24, 28, 29	51.00						51.00						50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00				42.00
Solid steel axles	RR 25	58.00						58.00						57.00				56.50						56.00				55.00	55.15	54.00	53.50	53.00			52.00	51.00				49.00
No. 3 steel wheels	RR 27	51.00						51.00						50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00				42.00
Unassorted	RR 35	40.00						40.00						39.00				38.50						38.00				37.00	37.15	36.00	35.50	35.00			34.00	33.00				31.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall. Cincinnati: Newport. St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland. Claymont: Chester. Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap)—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line prices of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C and amend. 4, CPR 5.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Under Amend. 5 to CPR 5 ceiling prices are established for certain unprepared grades. Unprepared steel scrap for compression into No. 1 bundles calls for a $6 differential (or deduction) from the base (No. 1 bundles). Unprepared steel scrap for No. 2 bundles, $9 from base. Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base. Sec. 7 (a) (2) (Railroad grades) is amended to include: Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: **Nickel:** $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum:** $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese:** $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon:** electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium:** $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys:** if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling prices on billet, bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer.

See Amend. 5 to CPR for setting of single price on No. 1 Heavy, No. 2, and No. 2 bundles. No. 1 bundles are made prime grade from which to add or subtract differentials. Amendment also puts dealer to dealer sales under ceilings, permitting a $1 resale margin, and trucking charges may be added only on shipments of prepared scrap.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate; 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	32.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	36.00
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	32.00
Mixed borings, turnings	32.00
Cast scrap	55.00

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Jan. 22, 1952	Jan. 15, 1952	Dec. 25, 1951	Jan. 23, 1951
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.50
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	7.40
Special coated mfg. ternes	7.50	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Jan. 22, 1952	Jan. 15, 1952	Dec. 25, 1951	Jan. 23, 1951
Foundry, del'd Phila	$57.97	$57.97	$57.97	$57.97
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.83
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic del'd Philadelphia	57.09	57.09	57.09	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	186.25

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$46.13
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	47.50
No. 1 steel, Chicago	41.50*	41.50*	41.50*	44.63
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	40.25
Low phos. Young'n	46.50*	46.50*	46.50*	54.50
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	67.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	62.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	63.00

* Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	17.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.03	$1.03	$1.78
Zinc, East St. Louis	19.50	19.50	19.50	17.50
Lead, St. Louis	18.80	18.80	18.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	53.55
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00

†Tentative.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Jan. 22, 1952	4.131¢ per lb.	$52.72 per gross ton	$42.00 per gross ton
One week ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One month ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One year ago	4.131¢ per lb.	52.69 per gross ton	46.08 per gross ton

	High	Low
1952	4.131¢ Jan. 1	4.131¢ Jan. 1
1951	4.131¢ Jan. 2	4.131¢ Jan. 2
1950	4.131¢ Dec. 1	3.837¢ Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3
1948	3.721¢ July 27	3.193¢ Jan. 1
1947	3.193¢ July 29	2.848¢ Jan. 1
1946	2.848¢ Dec. 31	2.464¢ Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1
1944	2.396¢	2.396¢
1943	2.396¢	2.396¢
1942	2.396¢	2.396¢
1941	2.396¢	2.396¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

	High	Low
1952	$52.72 Jan. 1	$52.72 Jan. 1
1951	52.72 Oct. 9	52.69 Jan. 2
1950	52.69 Dec. 12	45.88 Jan. 3
1949	46.87 Jan. 18	45.88 Sept. 6
1948	46.91 Oct. 12	39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept.19	20.61 Sept.12
1938	23.25 June 21	19.61 July 6
1937	32.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug.11
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1952	$42.00 Jan. 1	$42.00 Jan. 1
1951	47.75 Jan. 30	42.00 Oct. 23
1950	45.13 Dec. 19	26.25 Jan. 3
1949	43.00 Jan. 4	19.33 June 28
1948	43.16 July 27	39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	1892 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar.30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1929	17.58 Jan. 29	14.08 Dec. 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Same Pace—The Chicago used machinery market is holding the same business pace as the New Year progresses. There is little change in selling activity while, true to form, demand for late type production equipment remains high. It is becoming increasingly difficult to locate machine tools of this desired type.

Dealers are still able to locate a few good tools here and there but this procurement is spotty and will not come anywhere near meetind demand. Some plant owners are said to be holding back machines because ceiling prices are not attractive enough. Another reason offered is that manufacturers are on the verge of entering large scale defense production and do not know for certain what tools they will need.

Basic reason for the shortage of late model machines is that American industry has grown to such a point and has been working at such a rate that surplus tools are just not available.

Out-of-Stock—Rebuilding older equipment in the Cleveland area is posing increasing problems. Out-of-stock replacement parts must be custom machined by the rebuilder. Late model machine parts can still be found stocked with manufacturers and delivery time is not considered too bad.

Some rebuilders say they can get late model parts in 2 to 4 weeks but some parts for older equipment are completely out of stock.

Rebuilder's Foundry — A rebuilder in the Akron area is operating a foundry as well as a machine shop. Scrap from antiquated machines is used to make hot metal for castings. This plant is virtually self-sufficient. Only electrical equipment must be "imported."

One Cleveland rebuilder won't accept orders for anything but machine tools released from government reserve stocks. Besides contending with such repair problems as ruined spindles, missing bearings, rotted wiring, and rust, the rebuilder is overburdened with government paper work. He has all sorts of forms to complete when accepting a job and more paperwork when the completed machine is shipped out.

Delayed Shipments—Rebuilders are harried by delayed shipment of reserve tools to their plants. Delivery schedules are disrupted when the tool arrives late from the depot—sometimes 2 months late. The entire burden of meeting shipping dates then rests with the rebuilder who must really scramble with rescheduling.

To date rebuilders report they have been able to meet commitments but would appreciate a little more promptness.

Demand in the Cleveland area for machine tools follows the nationwide pattern. Not much interest is being shown in older equipment but any good late model that turns up has many takers. Turning equipment seems to be leading demand.

First Standards—American Rebuilders Assn., Washington, reports it will soon issue the first established American standards for rebuilt industrial machinery or equipment. Title will be "Proposed Standards for Rebuilt Rotating Electrical Equipment." ARA has submitted a request for comment from many trade organizations. This will constitute end-user approval.

ARA is also sponsoring a contest to adopt an appropriate emblem for its organization. Cash prize is $25. ARA's address is 1604 K St., N.W., Washington 6, D. C.

Useful Ideas—National Industrial Service Organization is sponsoring its eighth prize award contest for useful shop ideas benefiting the electric motor industry. Prizes total $350 with first prize set at $100.